The International Seismological Summary.

1951 January, February, March.

INTERNATIONAL GEODETIC AND GEOPHYSICAL UNION.
ASSOCIATION OF SEISMOLOGY.
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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 fifteenth 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 :—

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

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

$$h=-3{\cdot}549+10{\cdot}738\cos 2\phi$$

(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 of 1951 contains 189 epicentres, 137 of which are repetitions from previous epicentres.

Jan.	1d. 20h.	18°·7S.	168°·4E.	0·015
	2d. 23h.	Undetermined shock		Deep.
	3d. 9h.	7·5N.	126·7E.	Base of Superficial Layers.
	4d. 3h.	38·4N.	73·6E.	0·015
	5d. 0h.	6·9N.	80·4W.	0·005
	6d. 5h.	36·5N.	71·0E.	0·030
	6d. 7h.	6·9N.	80·4W.	0·005
	8d. 18h.	35·6N.	140·0E.	0·005
	9d. 17h.	35·5N.	140·4E.	Base of Superficial Layers.
	10d. 2h.	35·5N.	140·4E.	0·005
	10d. 8h.	22·3S.	176·8W.	0·010
	10d. 19h.	52·0N.	176·2E.	0·010
	14d. 10h.	25·3S.	175·4W.	0·010
	15d. 4h.	14·9S.	167·1E.	0·010
	16d. 8h.	36·7N.	70·5E.	0·030
	16d. 23h.	39·2N.	141·9E.	0·010
	19d. 1h.	13·0N.	87·8W.	0·015
	23d. 7h.	Undetermined shock.		Suggested Deep.
	24d. 0h.	Undetermined shock.		Suggested Deep.
	24d. 6h.	41·0N.	143·3E.	0·015
	27d. 0h.	28·0S.	63·5W.	0·080
	28d. 10h. (0m.)	36·7N.	141·2E.	Base of Superficial Layers.
	28d. 10h. (20m.)	36·9N.	70·8E.	0·010
	29d. 4h.	7·5S.	129·0E.	0·020
	29d. 10h.	15·5N.	91·7W.	0·010
	31d. 8h.	35·5N.	140·4E.	0·005

Feb.	2d.	21h.	37·1N.	141·8E.	Base of Superficial Layers.
	2d.	23h.	37·0N.	30·5E.	Base of Superficial Layers.
	4d.	15h.	19·0S.	176·0W.	0·030
	7d.	3h.	31·2N.	140·4E.	0·010
	7d.	6h.	36·7N.	70·5E.	0·030
	9d.	1h.	22·3S.	179·2W.	0·080
	9d.	4h.	31·5S.	71·0W.	0·010
	10d.	8h.	43·9N.	146·2E.	0·010
	10d.	11h.	12·8N.	145·5E.	0·005
	10d.	15h.	6·0S.	110·0E.	0·090
	12d.	3h.	51·9N.	179·4E.	Base of Superficial Layers.
	13d.	8h.	14·5N.	90·5W.	Suggested Deep.
	13d.	11h.	15·4S.	174·6W.	0·030
	16d.	9h.	36·1N.	139·5E.	0·010
	17d.	21h.	7·1S.	146·0E.	0·025
	19d.	17h.	17·8S.	178·8W.	0·080
	21d.	7h.	36·0S.	179·0W.	0·005
	21d.	19h.	36·9N.	141·3E.	Base of Superficial Layers.
	21d.	20h.	18·9N.	68·9W.	Suggested Deep.
	22d.	17h.	24·3S.	67·4W.	0·015
	23d.	15h.	34·1N.	134·0E.	Suggested Deep.
	25d.	12h.	37·1N.	141·8E.	0·005
	27d.	22h.	41·2N.	142·5E.	0·005
Mar.	2d.	0h.	15·5N.	91·7W.	0·015
	4d.	11h.	16·0S.	74·5W.	0·015
	5d.	20h.	27·7N.	129·4E.	0·030
	7d.	18h.	35·5N.	142·1E.	Suggested Deep.
	8d.	12h.	37·1N.	141·8E.	0·005
	9d.	7h.	35·5N.	140·4E.	Base of Superficial Layers.
	9d.	16h.	20·5S.	179·0W.	0·080
	10d.	2h.	Undetermined shock.		Suggested Deep.
	10d.	21h.	15·5S.	167·1E.	0·020
	10d.	22h.	41·2N.	142·5E.	0·010
	11d.	9h.	Undetermined shock.		Suggested Deep.
	13d.	0h.	9·3S.	74·1W.	0·010
	13d.	17h.	21·5S.	179·0W.	0·080
	14d.	10h.	40·2N.	142·2E.	0·005
	14d.	12h.	23·3S.	66·4W.	0·010
	16d.	13h.	36·2N.	139·9E.	0·005
	23d.	21h.	31·8S.	179·5E.	0·040
	24d.	0h.	10·6S.	165·5E.	0·020

Mar.	24d.	20h.	13·1N.	88·4W.	Suggested Deep.
	25d.	15h.	13·1N.	88·4W.	Suggested Deep.
	25d.	20h.	Undetermined shock.		Suggested Deep.
	28d.	1h.	36·9S.	177·1E.	0·050
	30d.	2h.	37·1N.	71·2E.	0·015
	31d.	1h.	22·3S.	176·8W.	0·020
	31d.	6h.	18·6S.	179·1W.	0·090
	31d.	9h.	60·4N.	153·6W.	0·030

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

KEW OBSERVATORY,
Richmond,
SURREY.

February, 1959.

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.

1951 JANUARY, FEBRUARY, MARCH.

Jan. 1d. 1h. 33m. 22s. Epicentre 29°·0N. 96°·0E. (as on 1950, Dec. 3d.).

$A = -·0916$, $B = +·8712$, $C = +·4823$; $\delta = -1$; $h = +2$;
$D = +·995$, $E = +·105$; $G = -·051$, $H = +·480$, $K = -·876$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		8·1	257	e 1 40	−22	3 20	−15	2 15	P_g	—
New Delhi		16·5	273	e 3 43	−11	i 6 18	−40	—	—	—
Przhevalsk		19·6	318	e 4 34	− 2	—	—	—	—	—
Chilisk		20·2	320	e 4 42	+ 3	—	—	—	—	—
Naryn		20·5	318	e 4 41	− 1	—	—	—	—	—
Almata		20·9	318	i 4 48	+ 2	i 8 45	+10	—	—	—
Frunse		22·1	314	e 4 57	− 2	e 9 2	+ 4	—	—	—
Andijan		22·6	307	5 2	− 1	9 7	0	—	—	—
Fergana		22·9	306	e 5 5	− 1	—	—	—	—	—
Bombay	N.	23·4	249	e 5 15	+ 4	e 9 19	− 2	—	—	e 11·7
Kulyab		23·6	299	e 5 12	− 1	—	—	—	—	—
Obi-garm		23·8	301	i 5 11	− 4	e 9 17	−11	—	—	—
Stalinabad		24·5	301	e 5 18	− 4	e 9 29	−11	—	—	—
Tashkent		25·0	306	e 5 25	− 2	—	—	—	—	—
Tchimkent		25·1	309	i 5 29	+ 1	—	—	—	—	—
Samarkand		26·1	301	e 5 32	− 5	—	—	—	—	—
Sverdlovsk		37·3	328	7 26	+10	—	—	—	—	—
Stuttgart	Z.	66·8	314	e 10 56	0	—	—	e 11 2	P	—
College		74·3	23	e 11 56	+15	—	—	i 11 59	?	—
Tamanrasset	Z.	79·7	290	e 12 14	+ 3	—	—	—	—	—

Additional readings :—
Chatra P_gEN =2m.15s., QEN =2m.48s., SEN =3m.0s.
New Delhi PPE =3m.54s., QEN =6m.15s., SSEN =6m.38s.

Jan. 1d. 3h. 7m. 52s. Epicentre 48°·0N. 109°·5E.

$A = -·2220$, $B = +·6339$, $C = +·7409$; $\delta = +5$; $h = -5$;
$D = +·944$, $E = +·331$; $G = -·245$, $H = +·699$, $K = -·672$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Irkutsk	5·4	325	1 28	+ 4	i 2 42	S*	—	—	—
Vladivostok	16·5	99	i 3 54?	0	—	—	—	—	—
Nanking	17·5	152	i 4 0k	− 3	e 7 30	+ 9	—	—	8·8
Chilisk	21·9	271	e 4 58	+ 1	—	—	—	—	—
Przhevalsk	22·3	270	e 5 2	+ 1	—	—	—	—	—
Almata	23·0	272	i 5 10	+ 3	9 26	+12	—	—	—
Rybach'e	23·9	271	i 5 17	+ 1	—	—	—	—	—
Krasnogorka	24·2	272	e 5 19	0	—	—	—	—	—
Naryn	24·4	269	i 5 22	+ 1	—	—	—	—	—
Frunse	24·7	272	i 5 28	+ 4	i 9 56	+12	—	—	—
Andijan	27·2	269	i 5 49	+ 2	—	—	—	—	—
Chatra	27·3	226	e 5 47	− 1	—	—	—	—	—
Fergana	27·7	269	e 5 56	+ 4	—	—	—	—	—
Tchimkent	28·3	275	i 5 59	+ 2	—	—	—	—	—
Tashkent	29·0	273	e 6 2	− 2	e 10 56	+ 2	—	—	—
Obi-garm	30·0	268	i 6 13	+ 1	e 11 14	+ 4	—	—	—
Kulyab	30·3	266	e 6 16	+ 1	e 11 19	+ 4	—	—	—
Sverdlovsk	30·4	306	i 6 18	+ 2	11 26?	+10	—	—	—
Stalinabad	30·7	268	i 6 18	− 1	i 11 26	+ 5	—	—	—
Samarkand	31·3	271	e 6 25	+ 1	—	—	—	—	—

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.
Hyderabad	N.	39·6	231	—	—	e 13 34	− 4	—	—	—
Bombay		41·4	239	—	—	e 17 8	SS	—	—	—
Tiflis		45·0	287	e 8 22	+ 3	—	—	—	—	—
Pulkovo		45·2	316	e 8 24	+ 4	—	—	—	—	—
Gori		45·3	289	e 8 28	+ 7	—	—	—	—	—
Kodaikanal	E.	46·2	228	e 12 26	?	—	—	—	—	—
Zugdidi		46·4	290	e 8 37	+ 7	—	—	—	—	—
Upsala	N.	51·0	320	—	—	—	—	18 50	?	e 25·1
Kishinev		51·9	302	e 9 15	+ 3	—	—	—	—	—
College		52·7	32	i 9 15	− 3	—	—	—	—	—
Ksara		55·2	284	e 11 46	PP	21 10	SS	—	—	—
Collmberg	Z.	58·0	312	e 9 59	+ 2	—	—	—	—	—
Prague		58·0	311	—	—	e 20 40	?	e 31 36	?	e 32·1
Triest		61·2	308	e 10 18?	− 1	e 18 40	+ 2	—	—	e 33·5
Stuttgart		61·5	313	e 10 22	+ 1	—	—	—	—	e 33·1
Strasbourg		62·3	314	e 10 37	PP	e 18 46	− 6	e 11 16	PcP	e 33·1
Besançon		64·1	313	e 10 38	0	—	—	—	—	—
Rome		64·3	305	e 12 38	PP	e 19 18	+ 1	—	—	—
Paris		64·7	317	i 10 43	+ 1	e 20 30	ScS	e 33 8?	Q	e 39·1
Hungry Horse		76·9	28	i 11 53	− 3	—	—	—	—	—
Shasta Dam		80·5	37	i 12 12	− 3	—	—	—	—	—
Mineral		81·1	37	e 12 16k	− 2	—	—	i 12 20	PcP	—
Tamanrasset	Z.	82·1	296	e 12 21	− 3	—	—	e 15 31	PP	—
Brisbane	Z.	84·8	142	i 12 34k	− 3	—	—	—	—	—
Tinemaha	Z.	85·3	36	e 12 39	− 1	—	—	—	—	—
China Lake	Z.	86·6	36	i 12 36	−10	—	—	—	—	—
Ottawa	Z.	86·9	4	e 12 45	− 3	—	—	—	—	—
Huancayo		143·9	7	e 19 36	[− 1]	—	—	—	—	—
La Paz		148·5	354	i 19 52	[+ 7]	36 22	PPS	i 23 28	PP	71·4

Additional readings :—
Tamanrasset iZ = 12m.26s., eZ = 15m.59s., ePPP?Z = 17m.56s.
Ottawa iZ = 12m.48s.
Long waves were also recorded at Skalnate Pleso, Tortosa, Potsdam, Copenhagen, De Bilt, Kew, Budapest, and Rathfarnham Castle.

Jan. 1d. 3d. Undetermined shock.

Brisbane iPNZ = 26m.43s.a, iSE = 30m.40s.
Riverview iPZ = 27m.40s.a, iSE = 32m.21s., iSSE = 33m.45s., iSSSE = 34m.6s., iZ = 34m.20s., eLE = 35·0m.
Kaimata NE = 29m.
Wellington iPZ = 29m.54s.a, ePcP?Z = 31m.25s., S = 35m.38s., eScS? = 39m.35s., LZ = 45m.
College iP = 34m.3s.
Shasta Dam eP = 34m.44s.
Lick eP = 34m.46s.a.
Mineral eP = 34m.46s.k, i = 34m.51s. and 34m.55s.
Reno eP = 34m.53s.a.
Pasadena iP = 34m.57s.k, ipPZ = 35m.33s.
Tinemaha iPZ = 34m.58s.k.
Riverside iPZ = 35m.0s.k. epPZ = 35m.33s.
China Lake iPZ = 35m.0s.k, epPZ = 35m.34s.
Boulder City iP = 35m.3s., e = 35m.43s.
Hungry Horse iP = 35m.13s.
Pierce Ferry iP = 35m.14s., eSKS = 45m.44s.
Christchurch eS?EN = 39m.32s.
Stuttgart ePKPZ = 40m.42s.
La Paz ePNZ = 41m.6s., e = 44m.22s.
Prague e = 41m.7s., ePP = 42m.5s., e = 47m.29s., and 53m.14s.
Tamanrasset ePKPZ = 41m.15s., eZ = 41m.49s., ePPZ = 44m.38s.
Huancayo eP? = 44m.10s.

Jan. 1d. 20h. 16m. 34s. Epicentre 18°·7S. 168°·4E. Depth of focus 0·015.
(as on 1948, Aug. 8d.).

A = −·9285, B = +·1906, C = −·3187 ; δ = +1 ; h = +5 ;
D = +·201, E = +·980 ; G = +·312, E = −·064, K = −·948.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		16·6	235	i 3 48a	+ 2	i 6 58	+12	—	—	—
Auckland	N.	18·9	165	4 13	0	—	—	i 4 48	PP	—
Apia		19·6	79	4 21	+ 1	i 8 6	+17	i 4 36	pP	—
New Plymouth	E.	20·9	168	e 4 37	+ 3	—	—	—	—	—
Riverview		21·5	223	i 4 41k	+ 1	i 8 39	+14	i 4 56	pP	e 10·3
Wellington		23·2	170	i 4 54	− 2	8 58	+ 3	i 5 16	pP	e 12·1
Kaimata	N.E.	23·9	176	i 5 6	+ 3	—	—	—	—	—
Christchurch		25·0	173	i 5 14	+ 1	9 33	+ 8	i 5 34	pP	12·3
Guam		39·6	322	7 44	pP	—	—	—	—	—
Perth		49·0	244	i 13 23	?	i 15 36	+ 7	i 18 20	?	i 21·7
Honolulu		51·2	42	9 17	pP	—	—	—	—	e 23·0
Manila		57·2	303	e 9 35	− 1	i 13 38	PPP	i 10 0	pP	—
Bandong		60·1	274	e 9 58	+ 2	i 18 10	+13	—	—	—
Djakarta		61·2	274	i 10 1	− 2	e 18 19	+ 8	—	—	—
Nanking		69·3	316	10 57	+ 2	e 19 58	+ 8	i 11 18	pP	—
Vladivostok		70·1	333	i 10 58	− 2	i 20 5	+ 6	—	—	—
Berkeley		86·0	49	i 12 25k	− 2	e 22 53	+ 5	i 12 51	pP	e 35·8
Lick	z.	86·2	49	i 12 28k	0	—	—	e 12 51	pP	—
Shasta Dam		87·2	45	i 12 32	− 1	—	—	e 12 54	pP	—
Fresno	z.	87·3	51	e 12 33a	0	—	—	e 12 57	pP	—
Pasadena	z.	87·4	53	i 12 32	− 2	—	—	i 12 58	pP	—
Mineral	z.	87·6	46	i 12 34k	− 1	—	—	i 17 44	PPP	—
Riverside	z.	87·9	53	i 12 36	0	—	—	i 13 2	pP	—
Reno		88·5	48	e 12 39a	0	—	—	—	—	—
China Lake	z.	88·5	52	i 12 38k	− 1	—	—	i 13 5	pP	—
Tinemaha		88·5	50	i 12 40	+ 1	—	—	i 13 5	pP	—
Kabansk		88·5	327	12 46	+ 7	e 23 14	+ 2	—	—	—
College		89·8	17	i 12 42	− 3	e 24 8	sS	i 13 7	pP	38·3
Irkutsk		89·8	327	e 13 6?	pP	25 6	PS	16 26?	PP	—
Victoria	z.	90·2	38	e 12 46	− 1	—	—	—	—	—
Seattle		90·5	39	i 12 50k	+ 2	—	—	i 13 16	pP	—
Boulder City		90·6	52	i 12 49	0	—	—	e 13 16	pP	—
Pierce Ferry		91·3	52	i 12 52	0	—	—	i 13 17	pP	—
Tucson		92·3	56	i 12 57	0	—	—	i 13 20	pP	e 42·5
Logan		94·9	46	e 13 7	− 2	e 23 31	[0]	e 13 49	pP	—
Hungry Horse		95·8	41	e 13 13	0	—	—	i 13 40	pP	—
Tacubaya		98·2	72	e 10 3	?	—	—	—	—	—
Poona	E.	99·9	286	13 50	+19	25 0	+10	17 56	PP	—
Almata		103·6	312	e 18 4	PP	24 26	[+12]	20 5	PPP	—
Naryn		103·9	309	e 18 16?	PP	i 25 22	− 2	—	—	—
Frunse		105·2	310	e 18 22	PP	24 30	[+ 9]	27 36	PS	—
Andijan		106·4	308	e 18 35?	PP	e 24 35	[+ 8]	e 27 54	PS	—
Obi-garm		108·1	306	—	—	e 24 45	[+11]	—	—	—
Stalinabad		108·8	306	18 44	PP	e 24 48	[+11]	28 3	PS	—
Tashkent		108·8	309	e 18 27	PP	i 24 44	[+ 7]	i 28 8	PS	—
Huancayo		110·1	111	e 18 54	PP	e 24 54	[+12]	e 28 16	PS	e 50·0
Mary		114·1	304	e 18 33	[+ 9]	—	—	—	—	—
La Paz		114·3	119	e 15 0	P	25 12	[+13]	i 29 18	PS	53·4
Sverdlovsk		115·2	325	—	—	e 25 10	[+ 8]	29 13?	PS	—
Ashkabad		116·9	304	e 18 46	[+16]	—	—	e 19 35	PP	—
Cleveland	z.	171·1	52	i 21 6k	SKP	—	—	—	—	—
Kizyl-Arvat		118·6	305	e 19 1	PP	—	—	—	—	—
Ottawa	z.	121·2	47	e 18 37	[− 1]	—	—	—	—	—
Palisades		122·8	53	e 20 43	PP	—	—	e 37 40	SSP	—
Baku		123·4	307	e 20 32	PP	—	—	—	—	—

Continued on next page.

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Seven Falls	E.	124·3	45	—	—	36 23	$SKKS_2$	—	—	60·4
Grozny		126·2	311	e 19 20?	[+33]	—	—	—	—	—
Tiflis		127·2	309	e 18 49	[0]	—	—	—	—	—
Moscow		127·9	327	e 19 21?	[+30]	e 22 41	PKS	e 21 3	PP	—
San Juan		128·5	81	e 21 21	PP	e 25 59	[+14]	e 31 23	pPS	—
Abastumanj		128·6	309	e 19 0	[+ 8]	—	—	—	—	—
Zugdidi		129·2	310	e 18 46	[− 7]	—	—	—	—	—
Yalta		134·1	315	e 19 13	[+11]	—	—	—	—	—
Ksara		135·2	300	e 19 12	[+ 8]	—	—	i 19 31	pPKP	—
Helwan	z.	139·4	295	e 19 12	[0]	—	—	i 22 13	PP	—
Sofia		142·0	317	e 22 42	PP	—	—	—	—	—
Collmberg	z.	142·1	334	e 19 15	[− 2]	—	—	22 47	PP	—
Prague		142·4	334	e 19 21	[+ 3]	e 29 12	SKKS	e 22 35	PP	—
Belgrade	z.	142·7	321	e 19 27a	[+ 9]	—	—	e 22 49	PP	—
Jena		142·9	335	e 19 19	[0]	—	—	e 22 52	PP	—
Rathfarnham Castle		145·3	355	e 19 26	[+ 3]	e 26 13	[− 4]	e 22 28	PP	e 69·9
Stuttgart	z.	145·6	336	i 19 26k	[+ 3]	e 23 5	PKS	i 19 47	pPKP	—
Karlsruhe		145·7	336	i 19 27	[+ 4]	—	—	e 19 50	pPKP	—
Triest	z.	145·9	329	i 19 28	[+ 4]	i 23 9	PKS	i 19 48	pPKP	—
Kew		146·1	348	e 19 26	[+ 2]	e 41 55	SS	—	—	—
Strasbourg		146·3	337	i 19 29k	[+ 5]	e 42 14	SPS	i 19 50	pPKP	e 69·4
Chur		147·0	335	e 19 30k	[+ 4]	—	—	e 19 52	pPKP	—
Zürich		147·0	336	e 19 29	[+ 3]	—	—	e 19 49	pPKP	—
Taranto		147·1	318	19 42	[+16]	—	—	—	—	—
Basle		147·2	337	e 19 30	[+ 4]	—	—	e 20 6	pPKP	—
Neuchatel		147·9	337	e 19 30	[+ 3]	—	—	—	—	—
Paris		147·9	344	i 19 32	[+ 5]	i 41 47	SS	i 20 2	pPKP	72·4
Besançon		148·1	337	i 19 31	[+ 4]	—	—	i 19 55	pPKP	—
Pavia		148·4	332	—	—	e 23 4	PKS	—	—	e 69·6
Rome	z.	149·1	323	e 19 31k	[+ 2]	e 23 6	PKS	i 19 55	PKP_2	—
Messina		149·4	316	e 19 36	[+ 7]	—	—	e 20 11	pPKP	—
Algiers Univ.	z.	157·9	328	19 42	[+ 1]	—	—	e 20 47	$pPKP_2$	—
Alicante		158·2	338	19 44	[+ 3]	26 52	[+20]	24 12	PP	e 71·7
Tamanrasset	z.	163·5	287	e 20 9	[+22]	—	—	i 20 12	pPKP	—

Additional readings :—
Apia PPZ =4m.47s.
Riverview iZ =5m.3s., iPPE =5m.11s., iZ =5m.15s., iN =5m.48s., iZ =5m.52s., iE =5m.55s., iZ =8m.43s., isSEN =9m.5s., iEN =9m.49s.
Wellington PP =6m.23s., eZ =9m.26s.
Christchurch iPPZ =5m.52s., isSEN =10m.10s.
Manila iPPPEN =10m.9s.
Berkeley eZ =12m.39s., ePPZ =16m.9s., eE =24m.56s.
Lick iZ =12m.36s., ePPZ =16m.9s.
Shasta Dam ePP =16m.19s.
Fresno eZ =14m.24s., ePPZ =16m.20s.
Pasadena iPPZ =16m.19s.
Mineral ePPZ =16m.32s.
China Lake eZ =13m.1s., iPPZ =16m.27s.
College ePP =16m.33s., eSS =29m.22s.
Seattle i =12m.56s. and 13m.2s., isP =13m.30s., and other unidentified i readings.
Boulder City ePP =16m.46s.
Pierce Ferry iPP =16m.49s., ePKKP =30m.42s.
Tucson ePP =16m.43s., epPP =17m.15s.
Logan ePP =16m.59s., epPP =17m.19s., esPP =17m.32s., esS =24m.49s., eSS? =31m.27s.
Hungry Horse ePP =16m.51s., ePKP,PKP =38m.41s.
Poona SKSE =24m.2s., SKKSE =24m.32s., iE =25m.38s., SSE =31m.50s., SSPE =32m.0s.
Frunse eSKKS =25m.7s.
Andijan eSKKS =25m.16s.
Stalinabad PPP =21m.8s., SKKS =25m.25s.
Tashkent iSKKS =25m.25s., eS =26m.15s.
Huancayo e =19m.16s. and 25m.54s., ePPS =29m.26s., eSS =33m.56s., e =34m.14s., eSSS =38m.36s.
La Paz iPKPZ =19m.10s., iPPN =19m.36s., PPS =30m.30s., SS =35m.18s.
Sverdlovsk eSKKS =25m.48s.?, eSS =35m.38s., eSSS =38m.44s.
San Juan e =35m.2s., eSS =38m.45s.
Ksara ePP? =21m.48s.

Continued on next page.

Helwan eZ =19m.32s., iZ =22m.35s., PPPZ =35m.6s.
Prague e =20m.32s. and 21m.42s., eSKP =22m.52s., e =23m.3s., 23m.29s., and 23m.36s., eSKSP =32m.51s., ePPS =35m.33s.
Belgrade eZ =19m.47s.
Jena ePKPN =19m.22s., eE =19m.35s., eN =21m.13s. and 22m.13s.
Rathfarnham Castle iZ =19m.48s., eEN =23m.28s., 23m.53s., 27m.53s., and 38m.8s.
Stuttgart iZ =19m.56s., eZ =20m.54s. and 21m.33s., ePPZ =22m.57s.
Triest iPPZ =23m.17s.
Strasbourg i =19m.32s., 20m.30s., and 20m.40s., ePP =22m.50s. and 23m.3s., e =24m.6s.
Zürich ePP =22m.54s.
Basle ePP =23m.26s.
Paris i =19m.55s., 20m.8s., 20m.18s., 20m.37s., 20m.58s., 21m.36s., and 22m.21s., iPP =22m.59s., ipPP? =23m.27s., i =24m.5s.
Besançon i =20m.58s., ePP =23m.18s., e =23m.46s. and 24m.16s.
Rome eZ =22m.15s., iPP =23m.27s.
Algiers Univ. ePKP$_2$Z =20m.19s., ePPZ =23m.49s.
Tamanrasset ePKP$_2$Z =20m.42s., ipPKP$_2$ =23m.4s., ePPZ =24m.24s., epPP =24m.51s., ePPP =28m.14s.
Long waves were also recorded at Pretoria, Harvard, Upsala, De Bilt, and Copenhagen.

Jan. 1d. Readings also at 1h. (College), 2h. (Zugdidi, near Erevan, Leninakan, Tiflis, and Gori), 3h. (Lenkoran), 4h. (New Delhi and Stuttgart), 5h. (Mizusawa), 6h. (near Dzhergetal), 7h. (College (2), Chilisk, Krasnogorka, Tchimkent, near Tashkent, Kurmenty (2), Dzhergetal, Rybach'e, Fergana, Kulyab, Obi-garm, Frunse, Almata, Naryn, Andijan (2), Stalinabad, and Przhevalsk), 8h. (La Paz and near Ashkabad), 9h. (near Ashkabad and Mary (2)), 10h. (Tchimkent, Tashkent, Obi-garm, near Andijan, Naryn, Fergana, and Dzhergetal), 12h. (near Klyuchi), 13h. (Apia), 15h. (Kurmenty), 16h. (College and Ksara), 17h. (College (3), Huancayo, La Paz, Shasta Dam, Reno, Tinemaha, China Lake, Boulder City, Hungry Horse (2), Pierce Ferry (2), Tucson, near Tacubaya, Guadalajara, Vera Cruz, and near Apia), 18h. (College (2), China Lake, Hungry Horse, Pierce Ferry, Kulyab, Andijan, Fergana, Dzhergetal, near Stalinabad, Obi-garm, and near Mizusawa), 19h. (Stuttgart), 20h. (Apia, Chatra, and Huancayo), 22h. (near Tacubaya (2), Oaxaca, Kurmenty, and near Chilisk), 23h. (Tacubaya and Pierce Ferry).

Jan. 2d. 23h. Off the coast of Peru (U.S.C.G.S.). Depth approximately 60km.

Huancayo iP =12m.57s., epP =13m.8s., eS =14m.1s.
La Paz iPN =15m.5s., iPPN =15m.24s., iSN =17m.52s., SS =18m.16s., L =18m.50s.
Bogota eZ =15m.27s., iPP =15m.43s., iSEN =18m.33s., iSSE =18m.41s.
Galerazamba eP? =15m.27s.
St. Louis eP =20m.33s., eSS =31m.32s.
Tucson eP =20m.49s., ePcP =21m.31s., eL =37m.11s.
Harvard eP =20m.59s.
Weston iP =21m.0s., i =22m.2s.
Ottawa eZ =21m.15s.
Logan eP =21m.24s.
Pierce Ferry iP =21m.24s.
Boulder City iP =21m.27s.
Fresno ePZ =21m.54s.k.
Lick ePZ =22m.0s.k, eZ =22m.11s.
Mineral iPZ =22m.24s.k, iZ =22m.34s.
Hungry Horse iP =22m.28s., e =36m.32s.
La Plata E =23m.24s., LN =27·2m.
Tamanrasset ePZ =24m.41s., iZ =24m.51s., epPZ =25m.31s., eZ =26m.19s., ePPZ =28m.16s., ePPPZ =30m.12s.
Ccllege eP =24m.42s., ipP =24m.55s., eL =64m.30s.
Long waves were also recorded at Fort de France and Chatra.

Jan. 2d. Readings also at 0h. (Merida), 1h. (Merida, Tacubaya, Tucson, Pierce Ferry, Berkeley, Hungry Horse, College (2), Chatra, and Tamanrasset), 5h. (Paris), 7h. (La Paz, La Plata, Tacubaya, College, near Obi-garm (2), and Kulyab), 9h. (Hungry Horse, and Pavia), 11h. (College, Manila, and near Huancayo), 12h. (Shasta Dam, Tacubaya, Obi-garm, and near Kulyab), 13h. (Chatra, China Lake, Riverside, and near Apia), 14h. (Almata, Kulyab, Przhevalsk, Tashkent, near Andijan, Dzhergetal, Fergana, Frunse, Krasnogorka, Lunacharskoe, Naryn, Obi-garm, Rybach'e, Stalinabad, and Tchimkent), 15h. (Pasadena, China Lake, Pierce Ferry, Hungry Horse, Logan, Andijan, Sverdlovsk, near Ashkabad, near Bandong, Djakarta, and near Fort de France), 16h. (near Fergana), 17h. (Prague), 19h. (near Ashkabad), 20h. (Merida, Puebla, Tacubaya, Vera Cruz, China Lake, Tucson, Boulder City, Pierce Ferry, Hungry Horse, College, and Istanbul), 21h. (Mount Wilson, Riverside, China Lake, Tinemaha, College, Ksara, and near Ashkabad), 23h. (Pierce Ferry).

Jan. 3d. 9h. 47m. 55s. Epicentre 7°·5N. 126°·7E. Focus at Base of Superficial Layers.
(as on 1950, May 17d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		9·0	322	i 2 12	+ 1	e 3 44	− 8	—	—	
Bandong		23·8	235	e 5 16	+ 5	i 9 29	+ 8	—	—	
Djakarta		24·0	237	e 5 14	+ 2	e 9 24	0	—	—	
Nanking		25·5	344	5 28	+ 1	—	—	i 5 46	pP	
Kabansk		47·4	344	e 8 35	+ 2	—	—	—	—	
Irkutsk		48·3	342	e 8 42	+ 2	—	—	—	—	
Almata		56·2	319	i 9 39	0	—	—	—	—	
Frunse		57·6	317	e 9 48	− 1	—	—	—	—	
Andijan		58·4	313	9 55	0	e 17 55	+ 1	—	—	
Fergana		58·7	313	e 9 54	− 3	—	—	—	—	
Kulyab		59·5	310	e 10 0	− 2	—	—	—	—	
Obi-garm		59·8	311	i 10 0	− 4	—	—	—	—	
Stalinabad		60·4	311	e 10 9	+ 1	e 18 20?	+ 1	—	—	
Tashkent		60·8	313	e 10 11	0	—	—	—	—	
Tchimkent		60·9	315	i 10 9	− 3	—	—	—	—	
Samarkand		62·1	311	e 10 17	− 3	—	—	—	—	
Mary		65·6	308	e 10 43	0	—	—	—	—	
Ashkabad		68·4	308	e 11 1	+ 1	—	—	—	—	
Sverdlovsk		70·8	328	11 15	0	e 20 20	− 6	—	—	
College		81·3	26	i 12 21	+ 7	—	—	—	—	
Hungry Horse		103·1	37	e 14 6	+ 9	—	—	—	—	
Tamanrasset	z.	115·1	300	e 19 26	PP	—	—	—	—	
Harvard		127·5	15	e 19 9	[+ 7]	—	—	—	—	

Additional readings :—
Manila eP* = 2m.34s., eS* = 4m.12s.
College e = 12m.55s.

Jan. 3d. 12h. 21m. 28s. I
13h. 4m. 21s. II
Epicentre 17°·9N. 105°·8W. (as on 1943, May 26d.).

$A = -·2593$, $B = -·9162$, $C = +·3055$; $\delta = -1$; $h = +5$;
$D = -·962$, $E = +·272$; $G = -·083$, $H = -·294$, $K = -·952$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Manzanillo	1·8	50	0 31	− 1	—	—	—	—	0·9
II		1·8	50	0 30	− 2	0 46	−10	—	—	—
I	Guadalajara	3·6	40	0 54	− 4	—	—	—	—	1·7
II		3·6	40	0 57	− 1	—	—	—	—	1·6
I	Tacubaya	6·4	76	e 1 38	0	—	—	i 1 52	P*	i 3·2
II		6·4	76	1 42	+ 4	—	—	—	—	3·2
I	Puebla	7·3	80	e 2 17	P*	—	—	—	—	e 3·8
II		7·3	80	1 51	+ 1	—	—	—	—	e 3·5
I	Vera Cruz	9·3	80	e 2 18	+ 1	—	—	—	—	4·6
II		9·3	80	2 19	+ 2	—	—	—	—	4·4
I	Tucson	15·0	343	e 3 34	− 1	(i 6 39)	+16	—	—	i 6·6
II		15·0	343	i 3 35	0	e 6 17	− 6	—	—	e 6·7
I	Riverside	19·1	330	e 4 26	− 1	—	—	—	—	—
II		19·1	330	i 4 26	− 1	—	—	—	—	—
I	Pierce Ferry	19·5	340	e 4 15	−16	(e 8 22)	+16	i 4 33	P	e 8·4
II		19·5	340	i 4 32	+ 1	e 8 24	+18	i 4 53	PP	e 11·6
I	Pasadena	19·6	330	i 4 31	− 1	i 8 16	+ 8	i 4 52	PP	i 9·3
II		19·6	330	i 4 30	− 2	e 8 15	+ 7	—	—	i 9·2
I	Boulder City	19·7	338	i 4 35	+ 1	—	—	e 5 11	PP	e 10·5
II		19·7	338	e 4 34	0	—	—	—	—	e 12·2
I	China Lake	z. 20·7	333	i 4 41	− 3	—	—	—	—	—
II		z. 20·7	333	i 4 42k	− 2	—	—	—	—	—
I	Haiwee	21·1	333	i 4 48	0	—	—	—	—	—
II		21·1	333	i 4 48	0	—	—	—	—	—

Continued on next page.

			△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
			°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Tinemaha		22·0	333	i 4 57	− 1	—	—	—	—	—
II			22·0	333	i 4 57k	− 1	—	—	—	—	—
I	Fresno	z.	22·4	330	e 5 0k	− 2	—	—	—	—	e 11·8
II		z.	22·4	330	e 5 1k	− 1	—	—	—	—	e 14·6
I	Salt Lake City		23·4	347	e 5 14	+ 3	(e 9 29)	+ 8	—	—	e 9·5
II			23·4	347	e 5 13	+ 2	e 9 25	+ 4	e 6 17	PP	e 12·0
I	Lick		23·9	327	i 5 16a	0	e 9 50	+20	—	—	e 11·1
II			23·9	327	e 5 15k	− 1	—	—	e 6 13	PP	e 15·6
I	Santa Clara		24·0	327	i 5 23	+ 6	e 9 54	+22	—	—	e 15·0
II			24·0	327	e 5 20	+ 3	e 9 54	+22	—	—	e 14·8
I	Lincoln	E.	24·2	18	e 5 16	− 3	e 9 44	+ 9	—	—	e 12·3
II		E.	24·2	18	—	—	e 9 46	+11	—	—	e 12·2
I	Logan		24·3	350	e 5 21	+ 1	i 9 47	+10	e 5 43	PP	e 11·0
II			24·3	350	e 5 21	+ 1	i 9 30	− 7	—	—	e 9·8
I	Berkeley		24·6	327	e 5 23k	0	e 10 0	+18	—	—	e 12·7
II			24·6	327	i 5 23a	0	e 9 59	+17	—	—	e 12·8
I	Reno		24·7	334	e 5 26k	+ 2	e 10 2	+18	—	—	e 14·1
II			24·7	334	e 5 25	+ 1	—	—	e 6 5	PP	e 13·6
I	St. Louis		24·7	28	i 5 23	− 1	i 9 54	+10	—	—	i 13·1
II			24·7	28	i 5 24	0	i 9 53	+ 9	—	—	i 13·0
I	Florissant		24·8	28	i 5 24	− 1	i 9 54	+ 8	—	—	i 13·2
II			24·8	28	i 5 25	0	e 9 50	+ 4	—	—	i 13·0
I	Ukiah		26·0	328	e 6 4	+28	e 10 30	+24	—	—	e 10·9
II			26·0	328	e 5 59	+23	e 10 23	+17	e 6 51	PP	e 12·6
I	Mineral	z.	26·2	332	e 5 39a	+ 1	—	—	—	—	—
II		z.	26·2	332	e 5 37k	− 1	—	—	—	—	—
I	Rapid City	E.	26·2	5	e 5 39	+ 1	e 10 15	+ 6	—	—	e 13·4
II		E.	26·2	5	e 5 46	+ 8	e 10 13	+ 4	—	—	e 13·4
I	Shasta Dam		26·8	332	e 5 43	− 1	—	—	—	—	—
II			26·8	332	i 5 41	− 3	—	—	—	—	—
I	Columbia		27·2	48	e 5 50	+ 3	e 10 40	+15	—	—	i 11·7
II			27·2	48	e 5 49	+ 2	e 10 27	+ 2	—	—	e 13·6
I	Hungry Horse		31·1	350	i 6 23	+ 1	—	—	—	—	—
II			31·1	350	i 6 21	− 1	—	—	—	—	—
I	Cleveland		31·4	36	i 6 22a	− 3	—	—	—	—	e 17·1
II			31·4	36	i 6 23a	− 2	e 10 38	−54	—	—	—
I	Chinchina		32·2	109	e 6 33	+ 1	e 11 55	+10	—	—	15·5
I	Washington	z.	32·6	44	e 6 36	+ 1	—	—	—	—	e 18·7
II		z.	32·6	44	i 6 39	+ 4	—	—	—	—	e 14·2
I	Bogota		33·7	109	e 7 2	+17	e 12 19	+11	e 17 0	ScS	—
I	Buffalo		33·8	37	e 6 43	− 3	—	—	—	—	—
I	Philadelphia		34·4	44	e 6 41	−10	e 11 59	−20	—	—	i 18·9
II			34·4	44	e 6 44	− 7	—	—	—	—	i 18·9
I	Fordham		35·7	43	e 7 2	0	e 12 46	+ 7	—	—	19·7
I	Palisades		35·8	43	i 7 2	− 1	i 12 47	+ 6	e 19 48	Q	e 22·9
II			35·8	43	e 7 2	− 1	e 12 50	+ 9	e 19 50	Q	e 23·0
I	Ottawa		37·1	35	e 7 12	− 2	e 13 2	+ 1	—	—	e 20·0
II			37·1	35	e 7 13k	− 1	e 13 3	+ 2	—	—	e 20·0
I	Harvard		38·0	42	i 7 20	− 1	—	—	—	—	—
II			38·0	42	i 7 21	0	e 13 22	+ 8	e 21 6	Q	e 22·9
I	Weston		38·1	42	i 7 22	0	—	—	—	—	—
II			38·1	42	i 7 21	− 1	—	—	—	—	—
I	Shawinigan Falls	N.	39·5	36	e 7 38	+ 4	—	—	—	—	20·7
II		N.	39·5	36	e 10 17	?	—	—	—	—	21·0
I	Bermuda		39·7	61	e 7 37	+ 1	—	—	e 9 16	PP	e 16·9
I	Seven Falls	E.	40·8	36	7 44	− 1	14 4	+ 8	9 33	PP	21·9
II		E.	40·8	36	e 7 45	0	—	—	—	—	—
I	Huancayo		42·3	133	e 8 3	+ 6	e 14 32	+13	—	—	e 17·9
II			42·3	133	e 8 0	+ 3	e 14 29	+10	—	—	e 17·8
I	Sitka		45·3	338	—	—	e 15 10	+ 8	—	—	e 24·0
II			45·3	338	—	—	e 15 9	+ 7	—	—	e 22·6
I	La Paz		50·4	130	e 9 4	+ 3	i 16 25	+11	11 8	PP	23·7
II			50·4	130	i 9 3	+ 2	i 16 25	+11	i 16 39	PS	23·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	College	54·7	340	e 9 32	− 1	—	—	—	—	e 23·6
II		54·7	340	e 9 29	− 4	—	—	—	—	e 22·8
I	Resolute Bay	57·1	3	9 47	− 3	—	—	—	—	27·7
II		57·1	3	e 9 47	− 3	—	—	—	—	27·6
I	Rathfarnham C.	81·4	37	e 15 41	PP	e 22 50	+19	e 29 4	SSP	e 41·5
I	Kew	85·4	37	e 23 17	S	(e 23 17)	+ 6	—	—	e 43·5
I	Paris	88·2	39	—	—	e 32 50	SSS	—	—	e 42·5
I	Tamanrasset z.	101·6	62	e 18 9	PP	—	—	—	—	—

Additional readings :—
Tucson I i = 3m.53s., e = 4m.4s., i = 5m.42s., II e = 4m.9s. and 4m.43s.
Boulder City I e = 4m.56s.
Fresno II eZ = 5m.39s.
Lick I eZ = 5m.21s.
Logan I i = 5m.31s., e = 7m.19s., II e = 6m.53s.
Berkeley I eZ = 7m.0s., II iZ = 5m.29s.
Reno II eN = 7m.27s.
St. Louis I e = 5m.5s., II e = 5m.6s.
Florissant I e = 5m.6s.
Mineral I iZ = 5m.43s., eZ = 5m.57s., II iZ = 6m.3s.
Shasta Dam I e = 5m.57s.
Bogota I eScPEN = 14m.20s.
Long waves to shock I were also recorded at Seattle, Saskatoon, Halifax, De Bilt, Strasbourg, Stuttgart, and Copenhagen ; to shock II at Saskatoon, De Bilt, Stuttgart, Paris, Kew, and Rome.

Jan. 3d. 17h. 27m. 17s. Epicentre 38°·0S. 72°·7W. (as on 1949, April 20d.).

A = +·2349, B = −·7543, C = −·6131 ; δ = +4 ; h = −1 ;
D = −·955, E = −·297 ; G = −·182, H = +·585, K = −·790.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Plata		12·3	80	2 54	− 5	5 25	+ 7	—	—	6·4
La Paz		21·8	13	i 4 58	+ 2	i 9 5	+13	i 9 39	SS	11·2
Huancayo		26·0	354	e 5 34	− 2	e 10 1	− 5	i 6 0	pP	—
Bogota		42·4	358	e 7 57	− 1	e 14 21	+ 1	e 17 57	SSS	e 20·7
Tucson		78·4	328	e 12 5	+ 1	—	—	—	—	—
Harvard		80·1	2	i 12 12	− 1	—	—	—	—	—
Pretoria	z.	82·5	116	i 12 27	+ 1	—	—	—	—	—
Riverside	z.	82·8	324	i 12 28	+ 1	—	—	—	—	—
Ottawa	z.	83·1	358	e 12 26	− 3	—	—	—	—	—
Pierce Ferry		83·1	327	e 12 24	− 5	—	—	—	—	—
Boulder City		83·3	327	i 12 32	+ 2	—	—	—	—	—
Pasadena	z.	83·3	324	i 12 32	+ 2	—	—	—	—	—
China Lake	z.	84·4	325	e 12 33	− 3	—	—	—	—	—
Tinemaha	z.	85·7	325	i 12 45	+ 3	—	—	—	—	—
Fresno	z.	86·2	324	e 12 39	− 5	—	—	—	—	—
Lick	z.	87·5	322	i 12 54a	+ 3	—	—	—	—	—
Reno	z.	88·4	325	e 13 16k	+21	—	—	—	—	—
Hungry Horse		93·5	334	e 13 18	− 1	—	—	—	—	—
Tamanrasset	z.	95·0	65	i 13 26a	0	—	—	e 17 15	PP	—
Ksara		123·3	71	e 20 45	PP	e 29 55	?	—	—	—

Additional readings :—
La Plata PEN = 3m.6s., SE = 5m.37s., SEN = 5m.43s.
La Paz iZ = 5m.17s.
Huancayo e = 7m.14s.
Tucson i = 12m.23s.
Pierce Ferry i = 12m.30s.
China Lake iZ = 12m.38s.
Reno eZ = 13m.33s.
Tamanrasset eZ = 13m.33s.
Long waves were also recorded at Logan, Christchurch, and several European stations.

Jan. 3d. 21h. 14m. 14s. Epicentre 28°·7N. 94°·2E. (as on 1950, Sept. 30d.).

$A = -·0643$, $B = +·8762$, $C = +·4777$; $\delta = +6$; $h = +2$;
$D = +·997$, $E = +·073$; $G = -·035$, $H = +·476$, $K = -·879$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		6·5	255	e 1 38	−1	3 0	+5	e 2 12	P_g	2·8
Calcutta	E.	8·1	222	—	—	e 3 34	−1	10 28	PcP	4·4
New Delhi		14·9	274	e 3 34	0	6 30	+10	—	—	6·1
Hyderabad	E.	18·3	236	4 20	+3	e 7 49	+10	—	—	—
Kurmenty		19·2	322	i 4 29	+1	—	—	—	—	—
Almata		20·1	322	i 4 39	+1	e 8 28	+9	—	—	—
Frunse		21·2	316	e 4 51	+2	e 8 54?	+13	—	—	—
Poona	Z.	21·2	246	i 4 50	+1	e 8 52	+11	—	—	—
Nanking		21·5	74	e 4 47	−5	—	—	—	—	e 11·2
Audijan		21·5	309	e 4 54	+2	e 8 54	+7	—	—	—
Fergana		21·8	309	e 4 55	−1	—	—	—	—	—
Bombay		21·8	248	e 5 0	+4	e 9 3	+11	—	—	—
Kulyab		22·3	300	e 5 2	+1	i 9 7	+5	—	—	—
Obi-garm		22·6	304	i 5 5	+2	e 9 13	+6	—	—	—
Stalinabad		23·3	303	i 5 11	+1	i 9 23	+3	—	—	—
Lunacharskoe		23·9	308	e 5 18	+2	—	—	—	—	—
Tashkent		23·9	308	i 5 18	+2	—	—	—	—	—
Kodaikanal	E.	24·1	225	e 5 9	−9	—	—	—	—	—
Tchimkent		24·1	311	i 5 19	+1	—	—	—	—	—
Irkutsk		24·7	13	e 5 22	−2	—	—	—	—	—
Samarkand		24·9	303	e 5 26	0	—	—	—	—	—
Kabansk		25·1	16	5 24	−4	—	—	—	—	—
Sverdlovsk		36·7	330	i 7 11	+1	12 54	0	—	—	—
Moscow		48·1	321	e 8 42	−1	—	—	—	—	—
Stuttgart		65·9	314	e 10 48a	−2	—	—	—	—	—
College		75·2	23	i 11 43	−3	—	—	—	—	—
Tamanrasset	Z.	78·3	290	e 12 3	0	—	—	e 14 55	PP	—
Pierce Ferry		110·3	24	e 19 16	PP	—	—	—	—	—

Additional readings :—
Chatra SSEN = 3m.9s., S*EN = 3m.21s.
Calcutta eE = 4m.36s.
Poona iZ = 4m.58s. and 9m.0s.
Tamanrasset eZ = 13m.43s.

Jan. 3d. Readings also at 1h. (Tucson, Boulder City, Pierce Ferry, and College), 2h. (Riverview, Auckland, Kaimata, New Plymouth, Christchurch, Tuai, Wellington, Brisbane, Mount Wilson, Pasadena, Riverside, China Lake, Tucson, Boulder City, Pierce Ferry, Fresno, Berkeley, Lick, Reno, College, Huancayo, La Paz, La Plata, Collmberg, Stuttgart, Ksara, and Tamanrasset), 3h. (Fort de France, Palisades, Harvard, Kew, De Bilt, and Paris), 6h. (Wellington and Christchurch), 7h. (near Apia (2) and near Kurmenty), 8h. (Kaimata, Christchurch, Wellington, China Lake (3), Tinemaha, Pierce Ferry, Mineral, and Hungry Horse), 10h. (Tucson, Pierce Ferry, Hungry Horse, College, Tamanrasset, La Paz, and near Fort de France), 11h. (near Almata, Krasnogorka, Kurmenty, and Przhevalsk), 12h. (Pasadena, China Lake, Wellington, Christchurch, and College), 13h. (College, Christchurch (2), Andijan, Lunacharskoe, Obi-garm, near Kulyab, and near Victoria), 14h. (La Plata), 15h. (Riverview, Christchurch, Kaimata, New Plymouth, Tuai, and Wellington), 16h. (Mount Wilson, China Lake, Tucson, Pierce Ferry, Fresno, Lick, Reno, Huancayo, Stuttgart, Tamanrasset, Bandong, and Djakarta), 18h. (Kaimata, Tuai, Wellington (2), Christchurch, Mount Wilson, China Lake, and Tacubaya (2)), 19h. (near Ashkabad), 20h. (Pierce Ferry and Ashkabad), 23h. (Pietermaritzburg, Mount Wilson, Riverside, China Lake, Tinemaha, Boulder City, Pierce Ferry, College, and Ksara).

Jan. 4d. 3h. 38m. 22s. Epicentre 38°·4N. 73°·6E. Depth of focus 0·015.

Epicentre given by the stations of the U.S.S.R.

$A = +\cdot2218$, $B = +\cdot7537$, $C = +\cdot6186$; $\delta = -8$; $h = -1$;
$D = +\cdot959$, $E = -\cdot282$; $G = +\cdot175$, $H = +\cdot593$, $K = -\cdot786$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Murgab		0·3	97	0 22	+ 4	—	—	—	—	—
Khorog		1·8	239	0 35	+ 3	1 1	+ 5	—	—	—
Dzhergetal		2·0	294	0 37	+ 3	1 5	+ 5	—	—	—
Fergana		2·4	325	i 0 40	0	e 1 12	+ 2	—	—	—
Andijan		2·5	338	i 0 42	+ 1	i 1 16	+ 4	—	—	—
Kulyab		3·1	261	e 0 50	+ 1	e 1 28	+ 2	—	—	—
Obi-garm		3·1	276	i 0 52	+ 3	e 1 30	+ 4	—	—	—
Naryn		3·5	29	i 0 55	+ 1	—	—	—	—	—
Stalinabad		3·8	274	i 0 58	0	—	—	—	—	—
Lunacharskoe		4·4	313	i 1 7	+ 1	e 1 59	+ 2	—	—	—
Tashkent		4·4	313	i 1 6	0	i 1 57	0	—	—	—
Frunse		4·5	9	i 1 8	0	i 2 3	+ 4	—	—	—
Rybach'e		4·5	24	i 1 8	0	—	—	—	—	—
Krasnogorka		5·0	13	1 13	− 1	—	—	—	—	—
Samarkand		5·3	286	i 1 17	− 1	i 2 19	0	—	—	—
Almata		5·5	26	i 1 19	− 2	i 2 19	− 5	—	—	—
Kurmenty		5·8	36	i 1 25	0	—	—	—	—	—
Chilisk		6·3	34	i 1 31	− 1	—	—	—	—	—
Mary		9·3	269	i 2 8	− 4	e 3 48	− 7	—	—	—
New Delhi		10·2	162	i 2 20	− 4	i 4 8	− 9	2 36	PPP	—
Ashkabad		12·0	273	i 2 47	− 1	i 4 54	− 6	—	—	—
Semipalatinsk		12·9	19	e 2 47	−13	—	—	—	—	—
Kizyl-Arvat		13·5	278	i 3 6	− 1	—	—	—	—	—
Chatra		16·2	131	e 3 35?	− 6	e 6 24	−12	—	—	—
Bombay	N.	19·5	182	e 4 16	− 3	e 7 42	− 5	—	—	—
Poona	E.	19·8	178	e 4 23	+ 1	7 38	−15	7 54	SS	—
Calcutta	E.	20·2	136	e 4 31	+ 4	i 8 5	+ 4	—	—	—
Sverdlovsk		20·3	339	4 7	−21	8 5	+ 2	—	—	—
Tiflis		22·2	288	e 4 48	+ 2	8 46	+ 9	—	—	—
Abastumanj		23·7	290	e 5 5	+ 4	—	—	—	—	—
Irkutsk		25·4	45	—	—	e 9 32	0	—	—	—
Kodaikanal	E.	28·3	171	e 9 10	PcP	—	—	—	—	—
Moscow		29·6	318	—	—	e 10 38	− 1	—	—	—
Ksara		30·7	273	—	—	e 12 8	SS	—	—	e 15·8
Prague		42·9	306	e 8 10	+23	—	—	e 9 39	PP	—
Jena	N.	44·6	307	e 8 3	+ 2	—	—	e 9 48	PP	—
Stuttgart	Z.	46·5	305	e 8 15	− 1	—	—	e 9 46	PP	—
Strasbourg		47·5	305	e 8 24	0	e 9 15	sP	—	—	—
Tamanrasset	Z.	59·4	276	e 9 49k	− 2	e 10 44	sP	—	—	—
College		72·1	17	i 11 32	+20	—	—	i 11 43	pP	—
Hungry Horse		93·4	5	i 13 0	− 2	—	—	i 13 37	pP	—
Pierce Ferry		105·5	6	e 15 0	?	—	—	e 18 10	PKP	—

Additional readings :—
New Delhi P*EN = 2m.42s., P_gEN = 3m.7s., SSSEN = 4m.30s., S*EN = 4m.44s., S_gEN = 5m.16s. The depth of focus was not considered when these interpretations were made.
Poona PcPE = 9m.6s.
Calcutta eE = 2m.18s.
Prague eE = 10m.7s., e = 10m.17s.
Jena eN = 8m.23s., eE = 8m.26s.
Stuttgart eZ = 10m.28s. and 13m.27s.
College i = 12m.1s.

Jan. 4d. 23h. 13m. 26s. Epicentre 28°·7N. 94°·2E. (as on 3d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		6·5	255	e 1 39	0	3 0	+ 5	2 14	P_g	2·8
Calcutta	E.	8·1	222	—	—	e 3 49	+14	—	—	e 4·7
New Delhi		14·9	274	e 3 33	− 1	6 29	+ 9	—	—	6·4
Kurmenty		19·2	322	i 4 29	+ 1	—	—	—	—	—
Naryn		19·5	316	e 4 33	+ 2	—	—	—	—	—
Frunse		21·2	316	i 4 50	+ 1	—	—	—	—	—
Pooaa		21·2	246	i 4 49	0	8 48	+ 7	—	—	—
Andiyan		21·5	309	4 55	+ 3	e 8 58	+11	—	—	—
Fergane		21·8	309	e 4 56	0	—	—	—	—	—
Bombay		21·8	248	e 4 54	− 2	e 9 2	+10	—	—	—
Kulyab		22·3	300	e 5 2	+ 1	e 9 9	+ 7	—	—	—
Obi-garm		22·6	304	i 5 6	+ 3	e 9 15	+ 8	—	—	—
Stalinabad		23·3	303	i 5 11	+ 1	e 9 25	+ 5	—	—	—
Tashkent		23·9	308	e 5 19	+ 3	e 9 36	+ 6	—	—	—
Tchimkent		24·1	311	i 5 18	0	—	—	—	—	—
Samarkand		24·9	303	e 5 29	+ 3	—	—	—	—	—
Collmberg	Z.	62·9	316	e 10 26	− 4	—	—	—	—	—
Stuttgart	Z.	65·9	314	e 10 47	− 3	—	—	—	—	—
Strasbourg		66·8	314	e 10 44	−12	—	—	—	—	—
Paris		70·1	316	e 11 15	− 1	—	—	—	—	—
College		75·2	23	i 11 41	− 5	—	—	—	—	—
Tamanrasset	Z.	78·3	290	e 12 2	− 1	—	—	e 15 0	PP	—
Hungry Horse		99·2	19	e 13 42	− 3	—	—	—	—	—

Additional readings :—
Chatra SSEN = 3m.11s., S*EN = 3m.22s.
Stuttgart eZ = 10m.52s.

Jan. 4d. Readings also at 0h. (Apia, Dzhergetal, Fergana, Lunacharskoe, near Andijan, Khorog, Kulyab, Obi-garm, Samarkand, Stalinabad, and Tchimkent), 1h. (Ashkabad, Tucson, Pierce Ferry, and College), 2h. (Collmberg), 3h. (near Dzhergetal, Khorog, Kulyab, and Obi-garm), 4h. (College and near Grozny), 6h. (Wellington, Pierce Ferry, and Pretoria), 7h. (College and Istanbul), 8h. (Stuttgart and Tamanrasset), 9h. (La Paz, La Plata, Mount Wilson, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Pierce Ferry, Lick, Shasta Dam, Hungry Horse, and Tamanrasset), 10h. (Tucson, Pierce Ferry, College, Almata, Frunse, Naryn, Rybach'e, Stalinabad, near Andijan, Dzhergetal (2), Fergana, Khorog 2), Kulyab (2), Lunacharskoe, Obi-garm (2), Samarkand (2), and Tashkent), 11h. (near Krasnogorka), 12h. (Mount Wilson, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Pierce Ferry, Lick, Shasta Dam, Reno, Mineral, Fresno, and College), 13h. (Stuttgart, near Seattle, and near Huancayo), 14h. (Tucson, Boulder City, Pierce Ferry, and Stuttgart), 15h. (Merida, Puebla, Tacubaya, Vera Cruz, Tucson, Boulder City, Hungry Horse, and College), 18h. (near Chilisk), 21h. (China Lake (2), Tucson, Overton, Pierce Ferry (2), Hungry Horse, College, Jena, Stuttgart, and Tamanrasset), 22h. (China Lake, Overton, College, Auckland, Christchurch, Wellington, and near Apia).

Jan. 5d. 0h. 52m. 40s. Epicentre 6°·9N. 80°·4W. Depth of focus 0·005.
(as on 1948, December 17d.).

Felt throughout the Panama Zone. Epicentre 7°N. 81°W. Depth 100km.

L. M. Murphy and W. K. Cloud.
U.S.A. Earthquakes 1951, Serial 762, Washington, D.C., 1953, p. 20.

$A = +·1656$, $B = -·9789$, $C = +·1194$; $\delta = -8$; $h = +7$;
$D = -·986$, $E = -·167$; $G = +·020$, $H = -·118$, $K = -·993$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights	2·2	22	i 0 33	− 2	i 1 2	0	—	—	—
Galerazamba	6·4	38	i 1 36	+ 2	i 2 52	+ 6	—	—	—
Bogota	6·7	110	i 1 43	+ 5	i 3 31	+37	i 2 5	pP	i 4·7
Merida	16·6	328	i 3 47k	− 3	i 6 55	+ 4	i 9 17	?	—
San Juan	18·0	50	e 4 7	0	i 7 36	+13	—	—	e 8·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		19·5	166	i 4 31	+ 7	i 8 16	pP	e 4 50	pP	—
Vera Cruz		19·6	311	e 4 32	+ 7	—	—	—	—	—
Fort de France		20·4	68	i 4 37	+ 3	i 8 42	SS	—	—	—
Puebla		21·1	308	e 4 33	− 8	e 8 30	+ 3	—	—	—
Tacubaya		22·1	307	i 4 49	− 2	i 8 51	+ 6	—	—	—
Guadalajara		26·1	306	e 5 32	+ 2	—	—	—	—	—
La Paz		26·1	152	i 5 35a	+ 5	i 10 20	SS	i 8 48	PcP	13·8
Columbia		27·0	0	e 5 36	− 2	e 9 52	−17	—	—	e 11·9
Bermuda		29·2	29	e 6 0	+ 2	e 10 41	− 3	—	—	e 12·2
Washington	z.	32·0	7	i 6 21	− 1	—	—	—	—	e 13·8
St. Louis		32·8	347	e 6 25	− 4	i 11 36	− 5	i 6 48	pP	—
Florissant		33·0	347	e 6 29	− 2	e 11 38	− 6	—	—	—
Lubbock		33·2	327	6 30	− 3	—	—	—	—	—
Philadelphia		33·6	10	i 8 26	pPP	i 12 28	+35	—	—	e 14·8
Pennsylvania		33·8	5	i 6 39	+ 1	i 11 58	+ 2	i 7 42	PP	—
Palisades		34·4	12	e 6 43	0	i 12 10	+ 5	e 8 0	PP	e 15·4
Cleveland		34·5	359	i 6 39a	− 5	i 12 4	− 3	i 14 2	SS	—
Buffalo		35·9	4	i 6 52	− 4	e 12 28	0	e 14 52	SS	—
Weston		36·6	13	i 6 58	− 4	—	—	—	—	—
Harvard		36·7	13	e 7 2	0	—	—	e 8 21	PP	e 17·8
Lincoln	E.	36·8	341	—	—	e 12 35	− 7	—	—	e 15·0
Tucson		37·9	317	i 7 10	− 3	e 13 4	+ 5	i 8 38	PP	e 15·8
Ottawa		38·9	7	e 7 15k	− 6	e 13 9	− 5	e 8 48	PP	—
Halifax		40·4	19	9 9	PP	13 39	+ 2	—	—	—
Seven Falls	E.	40·9	12	7 40	+ 3	13 48	+ 4	16 43	SS	—
Rapid City	E.	42·1	336	e 7 44	− 3	e 13 55	− 7	e 8 1	pP	e 17·1
Pierce Ferry		42·3	319	i 7 46	− 3	e 13 6	ScP	i 7 50	P	—
Overton	z.	42·6	319	i 7 51	0	—	—	i 7 55	P	—
Boulder City		42·8	318	i 7 53	0	i 8 43	sP	i 9 47	PP	—
Palomar		42·8	313	i 7 53	0	—	—	—	—	—
Riverside		43·5	315	e 7 57	− 2	—	—	i 8 1	P	—
Salt Lake City		43·7	327	e 8 2	+ 2	e 14 19	− 6	e 9 36	PP	e 19·5
Pasadena		44·2	315	i 8 1k	− 3	i 14 34	+ 2	i 8 5	P	—
Logan		44·4	329	e 8 4	− 2	i 14 44	+ 9	i 8 29	pP	e 18·0
China Lake	z.	44·6	316	e 8 4	− 4	—	—	i 8 22	pP	—
Tinemaha		45·7	318	e 8 14	− 2	—	—	i 8 18	P	—
Fresno	z.	46·6	317	e 8 20	− 3	e 15 8	+ 1	e 8 42	pP	—
Bozeman		46·7	333	e 8 21	− 3	e 15 7	− 1	e 10 21	PP	e 19·5
La Plata		46·8	155	8 26	+ 1	i 15 21	+12	10 8	PP	21·3
Butte		47·8	332	e 8 34	+ 1	e 15 22	− 2	e 18 33	SS	e 24·6
Reno		48·0	319	e 8 33k	− 1	e 15 16	−10	—	—	—
Lick	z.	48·1	317	e 8 34k	− 1	—	—	i 9 4	pP	—
Berkeley		48·8	317	i 8 39a	− 2	e 15 39	+ 1	e 10 17	PP	—
Mineral	z.	49·6	319	e 8 44k	− 3	—	—	i 8 47	P	—
Saskatoon		50·0	340	—	—	i 15 50	− 4	i 18 34	ScS	26·3
Ukiah		50·1	318	e 14 58	?	—	—	—	—	e 26·8
Hungry Horse		50·2	332	i 8 48	− 3	e 15 54	− 3	e 18 37	ScS	—
Arcata	z.	51·5	318	e 9 15k	pP	—	—	—	—	—
Seattle		54·0	328	e 9 20k	0	e 19 16	ScS	e 9 49	pP	—
Victoria		55·1	328	i 9 26a	− 2	e 17 4	0	e 19 19	ScS	—
Resolute Bay		68·2	356	10 51	− 5	19 44	− 5	20 43	PPS	—
Scoresby Sund		73·3	18	i 11 26	0	—	—	—	—	35·3
College		74·3	337	i 11 30	− 2	i 20 55	− 5	i 21 35	sS	e 30·2
Malaga		74·7	53	i 11 37	+ 3	i 21 53	PS	—	—	37·3
Rathfarnham Castle		75·0	37	e 11 37	+ 1	e 21 6	− 2	i 11 49	pP	—
Toledo		75·1	51	i 11 39	+ 2	e 21 21	+12	—	—	—
Granada		75·3	54	11 31a	− 7	21 37	sS	14 25	PP	37·8
Almeria		76·2	54	11 51	+ 8	21 37	+16	14 47	PP	—
Alicante		77·8	52	e 11 42	−10	21 30	− 8	14 49	PP	e 37·9
Kew		78·3	39	e 11 58	+ 3	e 21 54	+11	—	—	e 35·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tortosa	E.	78·5	50	i 11 25	−31	—	—	—	—	—
Paris		80·0	42	i 12 6	+ 2	i 22 9	+ 8	i 12 42	pP	e 36·3
Algiers Univ.	Z.	80·7	54	e 12 10	+ 2	—	—	e 12 40	pP	—
De Bilt		81·7	38	—	—	e 22 20?	+ 1	—	—	e 39·3
Besançon		82·5	44	e 12 17	0	—	—	e 12 48	pP	—
Basle		83·6	43	e 12 23	0	—	—	—	—	—
Strasbourg		83·6	42	e 12 24 a	+ 1	e 22 48	+10	e 12 52	pP	e 39·3
Tamanarsset	Z.	83·6	67	i 12 26 k	+ 3	—	—	e 15 45	PP	—
Zürich		84·1	43	e 12 27 a	+ 2	e 22 46	+ 3	—	—	—
Stuttgart		84·6	42	i 12 28 a	0	e 22 51	+ 3	e 23 56	PS	41·8
Chur		85·0	44	e 12 31	+ 1	—	—	—	—	—
Jena	E.	85·9	40	e 12 36	+ 2	—	—	e 12 50	pP	—
Copenhagen		86·0	35	e 12 40	+ 5	i 23 10	+ 8	i 23 20	ScS	—
Collmberg	Z.	86·8	39	e 12 40	+ 2	—	—	—	—	—
Rome		87·6	48	i 12 37 k	− 5	e 22 55?	[− 7]	e 16 10	PP	—
Prague		87·8	40	e 13 52	?	e 23 18	− 1	e 23 56	sS	—
Triest		88·0	45	(i 12 43?)	− 1	—	—	(i 15 43?)	PP	—
Upsala		88·1	30	—	—	e 23 20?	− 1	—	—	e 42·3
Helsinki	N.	91·6	28	—	—	e 24 1	+ 8	—	—	—
Moscow		99·5	30	e 17 40	PP	i 24 15	[+ 7]	e 24 37	SKKS	—
Yalta		102·2	42	—	—	e 24 29	[+ 7]	—	—	—
Helwan	Z.	105·1	57	e 18 30	PP	—	—	—	—	—
Ksara		107·5	52	e 18 50	PP	33 54	SS	—	—	—
Sverdlovsk		108·9	21	e 18 44	PP	e 25 0	[+ 9]	e 26 28	S	—
Tashkent		124·5	27	e 20 29	PP	i 25 55	[+ 7]	e 27 37?	SKKS	—
Riverview		125·4	233	—	—	e 31 2	PS	—	—	e 59·6
Fergana		126·4	25	e 18 59	[+ 3]	—	—	—	—	—
Stalinabad		126·5	29	e 20 30	PP	25 50?	[− 4]	e 22 17	PKS	—

Additional readings and notes :—
Bogota iS_gEN =3m.54s.
Huancayo ePP =5m.14s.
La Paz iPPZ =6m.24s., SS =11m.33s.
St. Louis iP =6m.28s., i =12m.34s., iSS =13m.24s.
Palisades e =13m.8s., eSS? =14m.1s.
Cleveland ePN =6m.42s.
Buffalo i =7m.29s.
Tucson eS =12m.46s.
Rapid City ePPE =9m.37s.
Salt Lake City eSS =17m.43s.
Pasadena i =8m.25s., iZ =8m.42s.
Logan iP =8m.7s., ePP =9m.51s., i =11m.31s., eS =14m.29s.
China Lake iZ =8m.9s.
Bozeman eSS =18m.17s.
La Plata E =8m.56s., PPN =10m.12s., ScSE =18m.20s., ScSN =18m.32s.
Lick ePcPZ =9m.50s., eZ =11m.36s.
Berkeley iZ =8m.42s., eZ =8m.50s., ePcPZ =10m.8s., eScSE =18m.44s., ePKP, PKP?N = 41m.19s.
Mineral iZ =8m.55s.
Seattle e =9m.26s. and 9m.38s., esP =10m.6s., iPcP =10m.22s., esPcP =11m.4s.
Resolute Bay SSE =24m.14s.
College i =11m.33s., e =14m.27s., eSS =25m.46s.
Malaga iPP =15m.1s., PPP =16m.45s.
Rathfarnham Castle eEN =24m.15s.
Granada SS =26m.41s.
Alicante PPP =16m.58s., PS =22m.25s., SS =26m.44s., SSS =30m.18s., Q =32m.30s.
Paris i =12m.16s., e =13m.28s., iPP =15m.3s., i =22m.18s., iPS =23m.2s., i =23m.54s. and 25m.9s., eSSS =30m.18s.
Algiers Univ. eZ =13m.1s.
Strasbourg e =12m.32s. and 13m.29s., ePS =23m.46s., eSS =28m.26s.
Tamanrasset iPcPZ =12m.32s., epPPZ =16m.7s., PKP, PKP?Z =38m.52s.
Stuttgart eQ =39·3m.
Rome iSN =23m.28s., eSSE =29m.12s.
Prague e =15m.30s., eN =23m.31s., e =23m.47s., eSP =24m.20s., esSP? =24m.40s.
Triest readings reduced by 8 minutes.
Moscow iPS =26m.41s.
Sverdlovsk ePS =28m.7s., eSS =34m.2s., eSSS =38m.50s.
Tashkent eSKSP =30m.1s.?.
Stalinabad SKKS =27m.51s., PS =30m.42s.
Long waves were also recorded at Christchurch and Wellington.

Jan. 5d. 9h. 43m. 39s. Epicentre 39°·9N. 142°·4E. (as on 1950, Aug. 3d.).

Intensity IV at Hatinohe, II-III at Karumai. Epicentre 39°·7N. 142°·7E. Shallow.

Seismological Bulletin of the C.M.O., Japan, Jan., 1951, Tokyo, 1951, p.8, with macroseismic chart.

$A = -\cdot6095$, $B = +\cdot4694$, $C = +\cdot6389$; $\delta = +2$; $h = -2$;
$D = +\cdot610$, $E = +\cdot792$; $G = -\cdot506$, $H = +\cdot390$, $K = -\cdot769$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Miyako		0·4	230	0 16	+ 3	0 31	+10
Hatinohe		0·9	314	1 9	+49	1 23	+49
Morioka		1·0	258	0 23k	+ 2	0 40	+ 4
Mizusawa	E.	1·2	232	0 34	+10	0 50	+ 9
Aomori		1·5	307	0 24	− 4	0 52	+ 3
Akita		1·8	264	0 39	P_g	—	—
Sendai		2·0	215	0 25	−10	0 50	−12
Urakawa		2·3	7	0 26	−14	0 48	−21
Hukusima		2·6	215	0 53	P_g	1 25	S_g
Onahama		3·2	202	1 40	S	(1 40)	+ 8
Sapporo		3·2	346	0 49	− 3	—	—
Kusiro		3·4	26	1 21?	+26	—	—
Utunomiya		3·9	212	1 55	S	(1 55)	+ 5
Nemuro		4·2	34	1 26	P_g	—	—
Kumagaya		4·4	213	1 30	P_g	2 13	S*

Jan. 5d. 13h. Region of Santa Cruz Islands.

Brisbane iPEZ = 29m.37s.k, eSEN = 33m.8s.
Riverview iPZ = 30m.49s., ipPZ = 31m.17s., eSE = 35m.4s., isSE = 35m.49s., eLZ = 36·9m.
Wellington ePⁱZ = 32m.9s., eSⁱ = 37m.6s., eL = 41m.
Lick ePZ = 37m.44s.a.
College iP = 37m.45s., ipP = 38m.15s.
Shasta Dam eP = 37m.47s.
Mineral ePZ = 37m.49s.k.
China Lake ePZ = 37m.54s., iZ = 38m.11s. and 38m.16s.
Riverside ePZ = 37m.54s.
Tinemaha ePZ = 37m.55s.
Boulder City eP = 38m.8s.
Pierce Ferry eP = 38m.9s.
Tucson eP = 38m.18s.
Hungry Horse eP = 38m.25s.
Christchurch e = 40m.
Stuttgart ePKPZ = 44m.40s.
Tamanrasset ePKPZ = 45m.10s., $ePKP_2Z$ = 45m.51s., $epPKP_2Z$ = 46m.14s., ePPZ = 49m.37s.
Long waves were also recorded at Berkeley.

Jan. 5d. Readings also at 0h. (Lick, College, China Lake, Tinemaha, Overton, Pierce Ferry, Tuai, near Kaimata, Wellington, Christchurch, and New Plymouth), 1h. (College, Hungry Horse, Mineral, Lick, Reno, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Overton, Pierce Ferry, Tucson, Paris, Strasbourg, Stuttgart, Collmberg, Tchimkent, Naryn, near Khorog, Kulyab, Obi-garm, Dzhergetal, Stalinabad, Fergana, Andijan, Samarkand, and near Ashkabad), 2h. (Puebla, Merida, Tacubaya, China Lake, Tinemaha, Overton, Pierce Ferry, Dzhergetal, Naryn, Samarkand, near Obi-garm, Kulyab, Fergana, Stalinabad, Khorog, Andijan, Tashkent, Lunacharskoe, Tchimkent, and near Klyuchi), 6h. (Obi-garm, Khorog, near Dzhergetal, and near Apia), 7h. (Stuttgart, near Prato, and near Algiers Univ.), 8h. (College, Hungry Horse, Shasta Dam, Mineral, Mount Wilson, China Lake, Tinemaha, Boulder City, Pierce Ferry, Tucson, and Chatra), 9h. (Mount Wilson, China Lake, Tinemaha, Pierce Ferry, Tucson, Shasta Dam, College, and near Manila), 10h. (near Zürich, near Kurmenty, and Chilisk), 11h. (College, Hungry Horse, Boulder City, Pierce Ferry, Tucson, Tamanrasset, La Paz (3), Huancayo, Bogota, and near Galerazamba), 12h. (Chatra, Collmberg, near Stuttgart, Jena, Vienna, and Prague), 13h. (Prague, Besançon, Strasbourg, Ravensburg, Basle, near Chur, Zürich, Stuttgart, Prato, Triest, and near Huancayo), 15h. (Ashkabad (2) and Mizusawa), 16h. (Ottawa and near Apia), 18h. (Guadalajara, Tacubaya, Tucson, Pierce Ferry, Logan, Hungry Horse, China Lake, Mineral, Fresno, Dzhergetal, Obi-garm, near Fergana, Kulyab, Stalinabad, Andijan, and Khorog), 19h. (Tchimkent, Tashkent, near Lunacharskoe, and near Chilisk), 20h. (Basle, near Chur, Zürich, Stuttgart, Pavia, Bologna, and Salo, Tamanrasset, Hungry Horse, Pierce Ferry, and near Balboa Heights (2)), 22h. (Pierce Ferry, Tashkent, Lunacharskoe, near Kulyab, Stalinabad, and Dzhergetal), 23h. (College, Pierce Ferry, Samarkand, Tashkent, Lunacharskoe, near Khorog, Kulyab, Obi-garm, Stalinabad, Dzhergetal and Andijan).

Jan. 6d. 5h. 17m. 20s. Epicentre 36°·5N. 71°·0E. Depth of focus 0·030.
(as on 1950, Dec. 3d.).

Intensity VIII at Srinagar; V at Gurdaspur, Sonemarg, and Ranborpara; also felt at Dras Sring and Delhi. Epicentre 36°·5N. 70°·5E., depth 220km.

Seismo. Bull., Gov. of India, Met. Department, Jan. 1951, p.4, and March 31d., p.17.

$A = +\cdot2623$, $B = +\cdot7619$, $C = +\cdot5922$; $\delta = -1$; $h = 0$;
$D = +\cdot946$, $E = -\cdot326$; $G = +\cdot193$, $H = +\cdot560$, $K = -\cdot806$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Khorog		1·1	26	i 0 33	0	—	—	—	—	—
Kulyab		1·7	325	i 0 38	0	—	—	—	—	—
Obi-garm		2·4	335	i 0 46	+ 1	—	—	—	—	—
Dzhergetai		2·7	4	i 0 50	+ 2	—	—	—	—	—
Stalinabad		2·7	319	i 0 48	0	1 24	− 1	—	—	—
Murgab		3·0	51	i 0 53	+ 2	—	—	—	—	—
Fergana		2·9	9	i 1 2	0	i 1 50	0	—	—	—
Andijan		4·4	15	i 1 8	0	i 2 0	− 1	—	—	—
Samarkand		4·5	317	i 1 9	0	—	—	—	—	—
Lunacharskoe		5·0	347	i 1 16	0	—	—	—	—	—
Tashkent		5·0	347	e 1 17	+ 1	—	—	—	—	—
Tchimkent		5·9	349	i 1 27	0	—	—	—	—	—
Naryn		6·3	37	i 1 32	0	—	—	—	—	—
Frunse		7·0	23	i 1 41	0	—	—	—	—	—
Krasnogorka		7·4	24	i 1 44	− 2	—	—	—	—	—
Mary		7·4	281	i 1 45	− 1	—	—	—	—	—
Almata		8·2	33	i 1 56	− 1	—	—	—	—	—
Przhevalsk		8·3	42	i 1 56	− 2	—	—	—	—	—
Kurmenty		8·6	38	i 2 0	− 2	—	—	—	—	—
Ili		8·8	30	i 2 2	− 2	—	—	—	—	—
Chilisk		9·1	37	i 2 8	0	—	—	—	—	—
New Delhi		9·4	145	i 2 10	− 2	—	—	—	—	—
Ashkabad		10·2	282	i 2 24	+ 2	—	—	—	—	—
Kizyl-Arvat		11·9	287	i 2 45	+ 1	—	—	—	—	—
Semipalatinsk		15·4	23	i 3 27	0	i 6 8	− 4	—	—	—
Chatra		16·8	120	i 3 43	− 1	i 6 37	− 5	i 3 56	PP	7·3
Baku		17·0	291	i 3 47	+ 1	—	—	—	—	—
Bombay		17·6	176	i 3 52	0	i 7 6	+ 7	i 4 46	PP	7·6
Lenkoran		17·7	285	3 54	+ 1	—	—	—	—	—
Poona		18·1	171	i 3 57	− 1	i 7 12	+ 3	4 11	PP	—
Hyderabad		20·1	159	i 4 46	+28	i 8 20	+34	i 5 44	PP	10·6
Calcutta	E.	20·5	129	i 4 26	+ 4	i 7 57	+ 4	—	—	—
Grozny		20·5	298	i 4 26	+ 4	—	—	—	—	—
Tiflis		21·0	293	i 4 45	+18	—	—	—	—	—
Erevan		21·1	288	e 4 34	+ 6	—	—	—	—	—
Sverdlovsk		21·5	345	i 4 33	+ 1	i 8 12	+ 1	—	—	—
Leninakan		21·6	291	i 4 38?	+ 5	—	—	—	—	—
Piatigorsk		22·5	299	e 4 44	+ 3	—	—	—	—	—
Zugdidi		23·2	295	4 54	+ 6	—	—	—	—	—
Kodaikanal	E.	26·8	168	e 4 40	−41	i 9 40	+ 1	5 40	PP	12·5
Theodosia		28·1	300	e 5 33	0	—	—	—	—	—
Irkutsk		28·2	45	i 5 35	+ 1	9 57	− 5	i 6 19	pP	—
Ksara		28·7	275	e 5 39	+ 1	10 59	+49	—	—	—
Yalta		28·9	298	i 5 41	+ 1	—	—	—	—	—
Moscow		29·7	322	i 5 48	+ 1	i 10 28	+ 3	i 6 31	pP	—
Istanbul	E.	32·8	291	e 6 15	+ 1	e 11 19	+ 5	e 6 57	pP	—
Kishinev		32·8	304	6 15	+ 1	—	—	—	—	—
Helwan		33·7	271	i 6 22a	0	11 29	+ 1	7 3	pP	—
Bucharest		34·7	298	i 6 35	+ 5	i 11 45	+ 2	—	—	18·7
Pulkovo		34·9	326	i 6 34	+ 2	i 11 50	+ 4	i 7 20	pP	—
Lwow		36·2	308	i 6 44	+ 1	—	—	i 7 30	pP	—
Sofia		36·9	295	i 6 51	+ 2	i 13 40	?	i 7 40	pP	—
Athens		37·4	286	i 6 52a	− 1	—	—	i 7 41	pP	—
Helsinki		37·6	325	i 6 56	+ 1	i 12 29	+ 2	e 7 41	pP	—
Timisoara	E.	38·1	301	e 7 3	+ 4	—	—	e 7 34	pP	—

Continued on next page.

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		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Skalnate Pleso		38·6	307	i 7 7	+ 4	12 48	+ 6	e 7 53 pP	—
Belgrade		38·7	299	i 7 5k	+ 1	i 16 12	SSS	i 7 54 pP	—
Budapest		39·4	303	i 7 13	+ 3	14 18	sS	8 48 PP	—
Nanking		39·4	82	i 7 10	0	i 12 57	+ 3	i 7 55 pP	—
Kalossa		39·6	303	7 13	+ 2	e 14 8	sS	i 8 2 pP	—
Ogyalla		40·0	304	7 17	+ 2	e 13 5	+ 2	e 8 4 pP	e 20·9
Upsala		41·1	322	i 7 24	0	i 13 22	+ 3	i 8 10 pP	i 20·3
Vienna		41·2	305	e 8 32	pP	e 15 6	sS	c 9 51 pPP	—
Taranto		41·7	293	7 30	+ 2	e 16 20	SS	— —	—
Prague		42·4	307	i 7 36k	+ 2	e 13 28	−10	i 8 23 pP	e 23·7
Potsdam		43·1	311	i 7 43	+ 3	i 15 9	sS	i 8 30 pP	—
Collmberg		43·2	308	i 7 41	+ 1	e 15 12	sS	e 8 27 pP	—
Triest		43·3	302	i 7 41	0	i 14 14	+23	8 27 pP	—
Copenhagen		43·4	317	i 7 43	+ 1	e 13 59	+ 6	i 8 31 pP	—
Messina		43·6	290	e 7 44a	0	e 15 9	sS	e 8 34 pP	—
Cheb		43·7	308	e 7 41	− 4	e 13 47	−10	e 8 56 sP	e 19·8
Jena		44·1	308	i 7 49	+ 1	e 15 25	sS	i 8 36 pP	e 21·1
Rocca di Papa		44·8	296	e 7 54	+ 1	—	—	i 9 5 sP	—
Rome		44·9	296	i 7 53a	− 1	e 14 0	−14	i 8 44 pP	—
Bologna		45·2	300	e 7 59a	+ 3	e 15 41	sS	e 8 48 pP	—
Florence		45·4	299	i 7 56a	− 2	14 37	pS	i 8 48 pP	—
Prato		45·5	299	i 7 58	− 1	—	—	i 8 52 pP	—
Salo	z.	45·5	302	i 8 1a	+ 2	e 13 57	−26	i 8 50 pP	—
Stuttgart		45·9	306	i 8 3	+ 1	e 14 33	+ 5	i 8 50 pP	e 23·1
Chur		46·0	304	i 8 3a	0	e 15 52	sS	e 8 52 pP	—
Vladivostok		46·3	62	i 8 4	− 1	i 14 24	−10	i 8 51 pP	—
Karlsruhe		46·4	307	i 8 7	+ 1	e 16 0	sS	— —	—
Zürich		46·5	305	e 8 7a	0	e 10 59	PPP	e 8 53 pP	—
Pavia		46·6	302	e 8 0k	− 7	e 14 44	+ 6	i 8 59 pP	e 26·1
Strasbourg		46·9	306	i 8 10a	0	i 14 46	+ 4	i 9 0 pP	i 22·6
Basle		47·3	305	e 8 12a	− 1	e 11 7	PPP	e 9 2 pP	—
Bergen		47·3	323	i 8 13	0	e 14 56	+ 8	i 9 2 pP	21·1
Neuchatel		47·7	305	i 8 16	0	—	—	— —	—
De Bilt		48·0	312	i 8 19a	+ 1	i 15 3	+ 5	i 9 6 pP	—
Tunis		48·1	290	i 8 21?	+ 2	e 15 10?	+11	e 9 8? pP	—
Besançon		48·3	305	i 8 20	0	e 10 4	PP	e 9 6 pP	—
Kumamoto		48·6	76	8 22	− 1	14 51	−15	— —	—
Manila		49·5	103	i 8 31	+ 1	e 12 19	?	i 9 0 pP	—
Paris		50·2	307	i 8 35	0	i 15 34	+ 6	i 9 25 pP	—
Koti		50·5	74	8 34	− 3	15 30	− 2	— —	—
Clermont-Ferrand		50·6	303	i 8 34k	− 4	i 15 34	0	i 9 28 pP	e 23·2
Sumoto		51·2	72	8 41	− 1	15 47	+ 5	— —	—
Kobe		51·3	72	8 44	+ 1	16 10	+27	— —	—
Aberdeen	N.	51·4	319	i 10 3	PP	i 15 49	+ 4	i 11 37 PPP	24·0
Kew		51·4	312	i 8 45a	+ 1	e 15 49	+ 4	e 9 49 sP	e 22·7
Durham		51·5	315	i 8 45	0	i 17 14	?	i 9 58 sP	—
Edinburgh		52·2	317	—	—	15 51	− 5	i 17 25 ?	—
Siomisaki		52·3	73	8 50	0	15 57	0	i 9 39 pP	—
Barcelona		52·5	299	—	—	i 17 33	?	— —	—
Matusiro		53·0	68	8 54	− 2	15 54	−12	9 45 pP	—
Sapporo		53·0	59	8 56	0	16 7	+ 1	9 45 pP	—
Jersey	E.	53·1	309	8 57	+ 1	e 17 10	+62	— —	—
Algiers Univ.	z.	53·4	292	i 8 57a	− 2	e 13 18	ScP	i 9 48 pP	—
Tortosa		53·9	298	i 9 2	0	16 18	0	i 10 14 sP	—
Djakarta		54·1	134	e 9 47	pP	e 25 24	L	—	— (e 25·4)
Hukusima		54·2	67	9 4	0	16 21	− 1	i 9 53 pP	—
Mizusawa	E.	54·2	64	9 6	+ 2	16 21	− 1	— —	—
Sendai		54·3	65	9 5	0	16 35	+11	— —	—
Urakawa		54·3	60	9 7	+ 2	16 26	+ 2	e 10 25 sP	—
Tokyo		54·4	69	9 4	− 2	16 26	+ 1	— —	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rathfarnham Castle		54·6	315	i 9 7	0	e 16 16	−12	i 9 55	pP	e 25·2
Alicante		55·5	296	9 15	+ 1	16 31	− 9	10 15	PcP	e 26·4
Nemuro		55·9	58	9 15	− 2	16 44	− 1	—	—	—
Scoresby Sund		57·1	337	i 9 27a	+ 2	e 16 53	− 8	18 35	sS	—
Toledo		57·4	298	i 9 29	+ 2	e 17 3	− 2	i 10 18	pP	—
Almeria		57·5	295	i 9 35	+ 7	i 17 17	+11	11 37	PP	31·0
Tamanrasset	z.	57·5	276	i 9 27k	− 1	e 18 43	ScS	i 10 20	pP	—
Granada		58·2	296	9 29k	− 4	i 17 29	+14	10 9	pP	39·0
Malaga		59·0	296	i 9 32	− 6	i 18 44	ScS	12 30	PP	38·7
Reykjavik		59·1	330	i 10 52	PcP	i 19 5	ScS	—	—	—
Tananarive		59·4	207	e 10 30	PcP	17 38	+ 8	19 0	ScS	25·1
Klyuchi		60·4	40	i 9 46	− 2	—	—	i 10 43?	pP	—
Lisbon		61·5	299	i 9 56a	+ 1	i 19 29	sS	i 10 46	pP	28·0
Resolute Bay		68·7	357	10 42	+ 1	i 19 31	+ 6	11 34	pP	—
Ivigtut		70·9	334	i 10 56	+ 2	i 19 55	+ 5	i 21 23	sS	—
Pretoria	z.	73·9	219	i 11 10	− 2	—	—	—	—	—
College		74·5	16	i 11 14	− 2	i 20 31	0	i 12 7	pP	—
Pietermaritzburg	z.	76·0	216	i 11 27	+ 3	—	—	e 12 19	pP	—
Grahamstown	z.	80·9	217	i 11 49	− 1	—	—	—	—	—
Sitka		83·7	15	e 12 8	+ 3	i 22 16	+ 9	e 13 26	sP	—
Halifax		89·4	300	—	—	e 24 45	PS	—	—	—
Seven Falls	E.	90·0	336	12 36	+ 1	23 57	PS	28 33	SS	44·4
Shawinigan Falls	N.	91·1	336	e 12 44	+ 4	e 24 30	PS	—	—	—
Saskatoon		91·7	359	—	—	e 23 30	+ 9	e 24 33	PS	54·7
Ottawa		93·1	337	i 12 51	+ 1	e 23 40	+ 7	i 13 45	pP	—
Harvard		94·3	333	i 12 50	− 5	i 26 38	sPS	e 13 51	pP	e 38·9
Weston		94·3	333	i 12 56	+ 1	e 24 0	+16	i 13 52	pP	—
Victoria		94·4	10	i 12 57a	+ 2	i 23 50	+ 5	i 13 51	pP	—
Hungry Horse		95·4	4	i 13 1	+ 1	e 24 52	pS	i 13 55	pP	—
Seattle		95·4	9	i 13 2a	+ 2	e 23 4	[− 9]	i 13 56	pP	—
Buffalo		96·3	338	i 13 6	+ 2	—	—	e 14 1	pP	—
Palisades		96·4	334	i 13 5	+ 1	i 24 54	+52	e 13 58	pP	—
Fordham		96·6	334	i 13 5	0	i 24 55	+52	i 13 59	pP	—
Butte		97·8	3	e 13 16	+ 5	e 25 6	pS	e 32 54	SS	e 38·5
Philadelphia		97·8	334	e 17 49	PP	e 24 2	−11	e 25 4	pS	e 42·3
Pennsylvania		97·9	337	i 17 15	PP	i 23 13	[−13]	i 20 28	pPPP	—
Bozeman		98·2	1	e 14 6	pP	e 25 4	PS	e 17 14	PP	e 44·7
Cleveland		98·4	340	i 13 15a	+ 1	e 24 44	+26	i 14 10	pP	—
Washington	z.	99·4	335	e 14 14	pP	—	—	e 17 23	PKP	—
Chicago		99·6	344	e 19 39	PPP	e 25 9	+41	e 25 57	sS	e 43·9
Rapid City	E.	99·6	356	e 13 22	+ 3	e 24 19	− 9	e 14 22	pP	e 44·4
Bermuda		99·9	323	e 17 34	PP	e 25 20	PS	e 19 30	PPP	e 41·9
Brisbane		99·9	117	i 13 19k	− 1	i 24 53	+22	i 14 14	pP	—
Logan		102·1	2	i 13 32	+ 2	i 25 27	+38	i 14 29	pP	e 41·0
Lincoln	E.	102·2	351	—	—	e 24 59	+ 9	e 28 45	PPS	e 45·0
Shasta Dam		102·2	10	i 13 30	− 1	i 17 52	PP	i 14 0	pP	—
Riverview		102·3	123	i 13 33k	+ 2	e 23 47	[0]	i 14 24	pP	e 42·9
Mineral	z.	102·7	10	e 13 33a	0	i 18 44	PP	i 18 27	PKP	—
Florissant		103·1	346	—	—	e 24 15	[+24]	e 25 18	S	—
Salt Lake City		103·1	2	e 18 22	PP	e 23 57	[+ 6]	e 25 1	S	e 41·9
St. Louis		103·3	346	e 13 36	0	i 25 13	+14	i 14 31	pP	—
Reno	z.	103·7	8	e 13 39a	+ 2	e 18 46	PP	e 17 44	PKP	—
Berkeley		105·0	10	e 14 48	pP	e 25 40	+27	i 18 5	PKP	—
Columbia		105·2	337	—	—	e 25 28	+13	e 26 24	pS	45·7
Lick	z.	105·6	10	e 13 52a	P	e 38 10	P′P′	e 17 58	PKP	—
Santa Clara	z.	105·6	10	e 17 15	PKP	e 27 12	PS	e 18 23	pPKP	—
Tinemaha	z.	106·3	8	e 13 51	P	—	—	e 17 46	PKP	—
Fresno		106·4	9	e 13 50a	P	e 25 49	+24	e 18 7	PKP	—
China Lake	z.	107·6	4	e 13 56	P	e 28 49	PKKP	i 38 36	P′P′	—
Pierce Ferry		107·6	4	i 13 57	P	e 27 25	PS	e 29 16	PKKP	—

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		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Mount Wilson	z.	109·1	8	e 13 55	P	e 29 11	PKKP	e 18 4	PKP		—
Pasadena	z.	109·2	8	e 15 9	pP	e 23 52	[−26]	e 18 12	PKP		e 41·7
Riverside	z.	109·4	8	e 18 16	PKP	e 29 11	PKKP	e 19 53	sPP		—
Palomar	z.	110·1	7	e 18 6	PKP	i 30 4	PKKP	i 18 40	pPKP		—
Tucson		111·6	2	e 14 13	P	e 27 11	PS	e 18 1	PKP		e 44·0
San Juan		112·0	316	e 18 20	[+12]	e 24 21	[− 8]	e 20 2	PP		e 54·7
Christchurch		121·6	123	e 20 42	PP	e 29 40	PS	e 36 40	SS		—
Wellington		122·3	120	e 20 48	PP	e 29 48	PS	e 40 50	SSS		—
Vera Cruz		123·3	345	e 21 19	pPP	—	—	—	—		—
Tacubaya		123·6	349	e 18 47	[+16]	—	—	—	—		—
Bogota		127·7	314	i 18 40	[+ 2]	—	—	i 20 51	PP		—
La Paz		138·7	288	i 19 3a	[+ 4]	i 25 48	[+ 2]	i 20 0	pPKP		—
La Plata	E.	138·9	257	20 34	pPKP	23 22	PKS	22 28	PP		—
Huancayo		141·2	301	e 19 0	[− 4]	e 32 2	SKSP	e 22 19	PP		—

Additional readings :—
New Delhi iN =3m.35s.
Chatra iPPEN =4m.2s., iSSEN =6m.53s., iSSSEN =7m.7s.
Poona PPPEN =4m.21s., SSEN =7m.39s., SSSEN =7m.43s., PcPEN =8m.38s.
Irkutsk sS =11m.6s.?.
Istanbul eE =7m.54s., ePcPE =8m.36s., eE =11m.50s., esSE =12m.38s., eSSE = 13m.17s., eE =14m.57s.
Helwan sPEZ =7m.29s., PPE =7m.47s., sSN =12m.55s., EN =14m.13s.
Bucharest iN =6m.39s., eE =7m.1s., iN =7m.43s., iE =9m.32s. and 10m.5s., iN = 10m.19s., iE =10m.49s. and 12m.25s., iN =13m.22s., iS?N =14m.34s.
Pulkovo isS =13m.6s.
Skalnate-Pleso esPN =8m.19s., ePP =8m.35s., ePcP?N =9m.13s., esPP =9m.34s., esSN =14m.7s., and other unidentified readings.
Sofia i =8m.38s. and 10m.34s.
Athens i =7m.52s.
Helsinki esPEZ =8m.5s., ePPE =8m.26s., esSN =13m.48s., iSSN =15m.16s., esSSEN = 16m.23s., and several other readings.
Timisoara eN =7m.39s., iE =8m.12s., eN =8m.38s., iN =10m.54s.
Belgrade iPPZ =8m.16s., i =9m.36s., iZ =9m.45s., iNW =14m.9s., iNE =14m.19s. and 16m.18s.
Budapest iPPPE =9m.51s., PPPN =9m.56s., iN =11m.28s. and 12m.59s., eN =13m.48s., PSE =14m.40s.?, eSSN =15m.34s., SSE =18m.51s., eSSSN =19m.40s.?, eSSSE = 21m.13s.
Nanking iPP?Z =8m.21s., i =12m.53s. and 13m.45s., SS?E =15m.1s.
Kalossa ePPE =8m.51s., PPN =9m.1s., and other unidentified readings.
Ogyalla esP =8m.26s., ePP =8m.50s., epPPE =9m.23s., epPPN =9m.28s., esPP = 10m.51s., eScP?N =12m.48s., esS =14m.23s., eSS =16m.20s., and other unidentified readings.
Upsala iN =8m.20s., isPE =8m.32s., iPPN =8m.57s., iPcP =9m.15s., isPP =10m.4s., iE =10m.21s., isS =14m.31s., iN =15m.42s., iSS =16m.14s., isSSE =17m.10s.
Taranto i =10m.10s. and 14m.51s.
Prague isP =8m.45s., ePP =9m.5s., ipPP =9m.53s., isPP =10m.24s., esS =14m.58s., eScS? =16m.55s., epScS? =18m.15s., with other e readings.
Potsdam isPE =8m.50s., isPPE =10m.32s.?, isPPN =10m.35s., iE =12m.23s., iN = 12m.28s., isSN =15m.13s., iSSN =17m.7s., iE =17m.22s.
Collmberg esPE =8m.51s., ePP?E =9m.44s., eSSE =16m.58s., eSSN =19m.4s. and other unidentified e readings.
Triest iPcP =8m.49s., iPP =9m.23s., ipPP =10m.1s., iPPP =10m.27s., isS =15m.15s., iSS =17m.45s., isSS =18m.23s.
Copenhagen 8m.53s., PP =9m.35s., pPP =10m.11s., PPP =10m.34s., sS =15m.16s., 17m.21s., and 17m.31s.
Messina iZ =8m.55s.
Cheb e =8m.1s. and 8m.18s., ePP =9m.13s., ePPP =10m.13s., esPP? =10m.41s., e =11m.36s. and 14m.41s., esS =15m.26s., e =16m.38s., eSS =16m.58s., eScS = 17m.6s. and 17m.18s., esSS? =17m.53s., epScS? =18m.36s.
Jena isP?E =8m.58s., iPPN =9m.34s., ePPP?E =10m.46s., ePPP?N =10m.50s., eSS?N =18m.0s., and other unidentified phases.
Rocca di Papa e =9m.52s.
Rome iZ =9m.5s., isSE =14m.58s., iEN =15m.37s., iSS =18m.6s.
Bologna e =9m.12s., i =9m.37s., e =11m.14s.
Florence iZ =9m.9s., i =10m.54s., e =15m.44s., iSS =16m.42s.
Salo iZ =8m.4s. and 9m.10s., eZ =9m.36s.
Stuttgart ePcP =9m.10s., iPcPZ =9m.20s., ePP =9m.52s., ePPP =10m.56s., esS = 15m.50s., eScS =17m.43s., esSS? =18m.5s., esSSS? =19m.10s., with other unidentified readings.
Chur ePPP =10m.57s.
Vladivostok esS =15m.49s.
Zürich e =9m.15s.
Pavia iZ =8m.9s. and 9m.19s., ePPP =10m.45s., i =12m.16s., iPS =15m.55s., e = 16m.7s., eSS =18m.10s.

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Strasbourg isP =9m.21s., iPP =10m.4s., iPPP =11m.14s., iSP =15m.0s., isS =16m.9s., iScS =17m.29s., iSS =18m.20s. and 18m.35s., iSSS? =20m.1s., and other unidentified readings.
Bergen isPE =9m.25s., ePPPE =11m.10s., sSE =16m.18s., iN =18m.32s., eE =19m.16s., iN =19m.33s.
Tunis i =9m.19s.?, isP =9m.31s.?, iPP =10m.7s.?, ePP =10m.16s.?, ePPP =11m.15s.?, ipPPP =11m.54s.?, e =16m.4s.?, isS =16m.24s.?, eScS =17m.33s.?
Besançon i =8m.55s.
De Bilt isP =9m.26s., iPP =10m.19s., iPPP =11m.19s., isS =16m.23s., eSS =18m.40s.
Manila iSS =13m.0s.
Paris iPcP? =9m.41s., isP =9m.46s., iPP =10m.35s., iPPP =11m.42s., isS =16m.56s., iSS =19m.11s., isSS =20m.35s., and other unidentified i readings.
Clermont-Ferrand i =9m.18s., isP =9m.48s., iPP =10m.22s., iPPP? =11m.28s., iPPP =11m.47s., iScP =14m.23s., iPS =16m.46s., iScS =17m.42s., eSS =18m.43s., esSS =19m.36s., e =21m.37s.
Aberdeen iN =12m.20s., iPSN =16m.25s., iSSN =19m.29s., iSSSN =20m.49s.
Kew ePPPZ =12m.8s., iPcSE =13m.54s., esSEN =17m.10s., eSS =19m.50s.
Durham iE =12m.24s. and 12m.44s.,iEN =20m.46s. and 21m.4s.
Jersey eE =13m.10s. and 20m.43s.
Algiers Univ. eZ =9m.42s., iPcPZ =10m.2s., iZ =10m.36s., iPPZ =10m.58s.,epPP?Z =11m.34s., esPP?Z =12m.1s., ePPPZ =12m.16s.
Tortosa iE =13m.19s., PcSN =13m.49s.
Rathfarnham Castle ePcP?Z =9m.49s., esPZ =10m.28s., ePPEN =11m.3s., eEN =17m.50s., eSSEN =20m.57s.
Alicante PP =11m.19s., PPP =12m.31s., PS =17m.31s., PPS =20m.29s., Q =22m.49s.
Scoresby Sund i =10m.17s., e =10m.39s., i =17m.9s. and 21m.41s.
Toledo isP =10m.40s.?, ePPE =11m.40s.?, sS =18m.31s.
Almeria PPP =12m.51s.
Tamanrasset isPZ =10m.39s., eSSZ =21m.8s.?, and other eZ readings.
Granada pPcP =10m.56s., iPP =11m.47s., PPP =13m.17s., PcS =14m.24s., sS =18m.50s., iSS =21m.56s.
Malaga PPP =13m.54s.
Reykjavik i?E =12m.22s., eN =24m.10s.
Tananarive e =10m.54s., i =10m.57s.
Lisbon sP =11m.7s., PP?EZ =12m.22s., SPP?E =18m.39s.
Resolute Bay eE =14m.22s., PPP =15m.46s., i =20m.23s., iN =23m.22s.
Ivigtut i =12m.5s., 20m.49s., SS =24m.29s.
College iPcP =11m.28s., isP =12m.30s., i =13m.2s., ePP =14m.1s., isPP =15m.9s., i =17m.0s., iPS =21m.35s., isS =22m.1s., eSS =25m.36s., eSSS =27m.51s., e =37m.4s., iPKP,PKP =38m.8s.
Sitka ePP =16m.37s., ePS =23m.10s., esS =23m.25s., eSS =27m.47s., eSSS =32m.14s.
Seven Falls PPSE =24m.25s., QE =34m.12s.
Saskatoon e =26m.6s.
Ottawa i =26m.20s.
Harvard esP =14m.11s., i =14m.30s., iPP =16m.42s., isPP =17m.56s.
Weston i =26m.36s.
Victoria iZ =14m.43s., e =17m.37s., i =21m.49s., e =24m.49s.
Hungry Horse ePP =16m.48s., epPP =17m.39s., ePKP,PKP =38m.59s.
Seattle isP =14m.19s., ipPP =17m.49s., isPP =18m.11s., iPPP =18m.42s., isPPP =19m.58s., eSKKS =23m.30s., eS =24m.0s., eSP =25m.2s., ePS =25m.38s., eSPP 25m.51s., epS =26m.8s., esS =26m.36s., ePKKP =29m.20s., eSS =30m.20s., and other unidentified readings.
Palisades i =26m.36s.
Fordham i =26m.59s.
Butte e =22m.9s.
Philadelphia esS =25m.31s., iPPS =27m.15s., eSS =32m.32s.
Pennsylvania iEN =24m.43s. and 25m.3s.
Bozeman epPP =18m.22s., esPP =18m.48s., e =21m.3s., isS =25m.48s., iPS? =26m.26s., ePPS =26m.56s., e =29m.15s., eSS =31m.6s., esSS =32m.23s., eSSS =35m.54s.
Cleveland iPPZ =17m.16s., epPPZ =18m.13s., eE =22m.0s., iN =25m.6s., esSE =26m.51s., iN =26m.54s., eE =27m.9s.
Chicago e =22m.37s. and 22m.52s., ePPS =27m.5s., eSS =31m.41s.
Rapid City epPPE =18m.20s., esSE =26m.7s., ePPSE =27m.9s., eSSE =31m.19s., eE =38m.34s.
Bermuda epS =26m.22s., ePPS =27m.33s., eSS =31m.46s., eSSS =36m.30s.
Brisbane iZ =16m.28s., iE =27m.33s.
Logan ePP =17m.42s., epPP =18m.39s., isPP =18m.53s., iPPP =19m.44s.
Lincoln eE =34m.7s.
Shasta Dam isP =14m.40s., i =16m.26s.
Riverview iSKKSE =24m.22s., eS?E =25m.6s., iPSE =27m.5s., iPPSZ =28m.0s., iPPSN =28m.3s., iSSE =32m.10s., eSSS?E =36m.24s., and many other i readings.
Mineral iZ =13m.40s. and 15m.1s.
Florissant i =27m.45s. and 28m.8s.
Salt Lake City esS =26m.32s., e =29m.19s. and 30m.7s., eSS =32m.20s., esSS =33m.11s.
St. Louis e =24m.8s., i =26m.38s. and 28m.1s.
Reno eZ =16m.36s.
Berkeley eZ =15m.32s., epPPP?Z =21m.4s., epSNZ =27m.59s.
Columbia ePPS =28m.25s., eSS =32m.24s.

Continued on next page.

Lick eZ = 17m.15s.
Santa Clara eZ = 26m.15s., eE = 28m.50s.
Tinemaha eZ = 18m.9s.
Fresno eZ = 14m.45s., eE = 19m.52s., eN = 28m.29s.
China Lake eZ = 14m.49s. and 17m.51s., iZ = 19m.17s. and 30m.11s.
Pasadena iPPZ = 18m.52s., epPPZ = 19m.24s., isPPZ = 19m.50s., iZ = 20m.56s., esS?Z = 27m.35s., iNZ = 28m.46s. and 29m.14s., iZ = 30m.5s., eZ = 34m.13s., iZ = 34m.34s., iPKP$_2$PKP$_2$Z = 38m.0s.
Riverside eZ = 28m.46s. and 30m.5s.
Tucson iPP = 18m.49s., ipPP = 19m.58s., iPPP = 21m.23s., epPPP? = 22m.14s., eSP = 27m.57s., iPS = 28m.7s.,eSPP = 29m.3s., iPPS = 29m.11s., eSS = 34m.19s., eSSS = 38m.47s.
San Juan e = 26m.4s., ePKKP = 29m.36s.
Christchurch eZ = 21m.8s. and 23m.44s., e = 30m.54s.
Wellington ePPP?Z = 23m.56s.
Tacubaya e = 18m.58s.
Bogota ePPS?EN = 34m.40s.
La Paz iZ = 20m.56s., iPPZ = 21m.56s., ipPPZ = 22m.45s., iZ = 23m.34s., SKKSZ = 28m.30s., SS = 40m.18s., i = 41m.20s.
La Plata P?N = 20m.58s., PPN = 22m.34s., PKSN = 23m.34s., PSN = 34m.34s., E = 35m.4s.
Huancayo e = 20m.5s. and 22m.50s., eSS = 40m.40s., eSSS = 45m.42s.

Jan. 6d. 7h. 51m. 29s. Epicentre 6°·9N. 80°·4W. Depth of focus 0·005. (as on 5d.)

Intensity V at Panama and in the Canal Zone. Epicentre 7°·5N. 81°·0W. (U.S.C.G.S.), depth 100km.

L. M. Murphy and W. K. Cloud.
U.S.A. Earthquakes, 1951, Serial 762, Washington, 1953, p.20.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		2·2	22	i 0 34	− 1	i 1 4	+ 2	—	—	—
Chinchina		5·1	112	i 1 24	+ 8	i 2 34	SS	—	—	—
Bogota		6·7	110	i 1 47	+ 9	i 3 16	+22	i 2 11	pP	—
Merida		16·6	328	i 3 45k	− 5	i 6 49	− 2	—	—	i 8·1
San Juan		18·0	50	i 4 9	+ 2	i 7 38	sS	i 4 53	PP	i 9·3
Oaxaca		18·9	308	e 4 24	+ 6	e 7 56	sS	—	—	—
Huancayo		19·5	166	i 4 32	+ 8	i 8 8	sS	e 5 10	PP	—
Vera Cruz		19·6	311	e 4 25	0	i 7 57	− 1	i 8 33	PcP	—
Fort de France		20·4	68	i 4 31	− 3	i 8 31	sS	5 6	PP	e 11·4
Puebla		21·1	308	e 4 34	− 7	e 8 23	− 4	—	—	—
Tacubaya		22·1	307	i 4 47	− 4	e 9 0	sS	—	—	—
Guadalajara		26·1	306	e 5 31	+ 1	e 9 59	+ 5	—	—	—
La Paz		26·1	152	i 5 41a	pP	i 10 15	sS	i 5 54	pP	13·5
Columbia		27·0	0	e 5 40	+ 2	e 10 9	0	e 5 56	pP	e 11·2
Bermuda		29·2	29	e 6 1	+ 3	i 10 56	+12	e 6 33	sP	i 11·7
Washington	Z.	32·0	7	i 6 23	+ 1	—	—	i 8 52	PcP	e 13·0
St. Louis		32·8	347	e 6 25	− 4	i 11 38	− 3	i 6 49	pP	—
Florissant		33·0	347	e 6 27	− 4	i 11 41	− 3	i 6 43	pP	—
Pittsburgh		33·4	3	i 6 33	− 1	i 11 52	+ 2	i 7 43	PP	—
Philadelphia		33·6	10	e 6 46	pP	i 11 53	0	e 7 42	PP	i 14·4
Pennsylvania		33·8	5	i 6 37	− 1	i 12 1	+ 5	i 6 53	pP	—
Fordham		34·3	12	i 6 43	+ 1	i 12 9	+ 5	i 12 44	PcS	—
Palisades		34·4	12	i 6 45	+ 2	i 12 11	+ 6	e 9 16	PcP	e 16·3
Cleveland		34·5	359	i 6 42k	− 2	i 12 7	0	i 6 57	pP	—
Chicago		35·3	351	e 7 9	pP	i 12 12	− 7	i 8 3	PP	i 14·5
Buffalo		35·9	4	e 6 56	0	e 12 31	+ 3	i 8 14	PP	e 19·5
Weston		36·6	13	i 7 1	− 1	e 12 45	+ 6	i 7 23	pP	—
Harvard		36·7	13	i 7 0	− 2	e 12 38	− 3	e 7 23	pP	—
Lincoln	E.	36·8	341	e 7 25	pP	e 12 34	− 8	e 8 23	PP	e 14·9
Tucson		37·9	317	i 7 10	− 3	i 12 55	− 4	i 7 51	sP	i 15·6
Ottawa		38·9	7	e 7 17	− 4	i 13 11	− 3	—	—	—
Halifax		40·4	19	e 9 25	PP	13 43	+ 6	—	—	—
Shawinigan Falls	N.	40·4	10	7 33	0	13 45	+ 8	9 6	PP	22·2
Seven Falls	E.	40·9	12	7 39	+ 2	13 49	+ 5	16 46	SS	19·2
Santiago		41·2	167	e 7 51	pP	i 14 4	sS	9 25	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rapid City	E.	42·1	336	i 7 45	− 2	i 14 0	− 2	i 8 10	pP	e 17·0
Pierce Ferry		42·3	319	i 7 46	− 3	e 14 10	+ 5	i 8 31	sP	—
Boulder City		42·8	318	e 7 51	− 2	—	—	—	—	—
Palomar		42·8	313	i 7 50	− 3	—	—	—	—	—
Riverside		43·5	315	i 7 56	− 3	—	—	i 8 19	sP	—
Salt Lake City		43·7	327	e 7 58	− 2	e 14 24	− 1	e 17 26	SS	i 19·4
Pasadena		44·2	315	i 8 2	− 2	e 14 26	− 6	i 8 18	pP	i 19·3
Logan		44·4	329	e 8 3	− 3	e 14 24	−11	i 8 27	pP	e 17·6
China Lake	Z.	44·6	316	i 8 5	− 3	—	—	i 8 23	pP	—
Tinemaha		45·7	318	i 8 13	− 3	—	—	—	—	—
Buenas Aires		46·2	154	e 8 34	+14	15 18	+17	—	—	—
Fresno		46·6	317	e 8 21a	− 2	e 14 59	− 8	e 8 41	pP	e 23·5
Bozeman		46·7	333	e 8 27	+ 3	e 14 49	−19	e 10 9	PcP	e 18·4
La Plata		46·8	155	8 25	0	i 15 25	PS	10 7	PP	21·7
Butte		47·8	332	e 8 43	pP	e 15 21	− 3	e 11 7	sPP	e 19·4
Reno	Z.	48·0	319	e 8 32a	− 2	e 15 28	+ 2	e 8 51	pP	e 22·6
Lick		48·1	317	e 8 33k	− 2	e 15 41	+13	e 8 52	pP	—
Santa Clara		48·4	317	i 8 36	− 1	e 15 36	+ 4	—	—	—
Berkeley		48·8	317	e 8 37a	− 4	i 15 38	0	i 8 55	pP	e 22·3
Mineral		49·6	319	e 8 33k	−14	—	—	e 9 4	sP	e 25·1
Saskatoon		50·0	340	i 8 52	+ 2	i 15 56	+ 2	i 18 39	ScS	25·7
Ukiah		50·1	318	e 8 56	+ 5	e 15 46	−10	e 9 18	pP	e 19·8
Hungry Horse		50·2	332	e 8 48	− 3	e 15 57	0	—	—	—
Shasta Dam		50·3	320	e 8 47	− 5	—	—	e 9 9	pP	—
Arcata	Z.	51·5	318	e 10 9a	+68	—	—	e 10 31	pP	e 27·5
Seattle		54·0	328	i 9 19k	− 1	e 16 51	+ 2	i 10 19	PcP	e 23·5
Victoria		55·1	328	i 9 29k	+ 1	i 17 10	+ 6	i 19 32	ScS	27·5
Ivigtut		59·2	18	e 9 47	pP	i 19 3	PPS	—	—	—
Sitka		66·0	332	—	—	19 17	− 6	20 23	ScS	e 27·9
Resolute Bay		68·2	356	10 51	− 5	19 45	− 4	11 17	pP	—
Reykjavik		70·4	23	—	—	e 22 19	?	—	—	e 30·1
Lisbon		71·0	52	i 11 17k	+ 4	20 37	sS	11 43	pP	29·4
Scoresby Sund		73·3	18	e 11 27	+ 1	i 20 54	+ 5	i 14 6	PP	35·0
College		74·3	337	e 11 28	− 4	i 21 1	+ 1	i 11 50	pP	e 29·7
Malaga		74·7	53	i 11 39	+ 5	i 21 13	+ 9	14 33	PP	36·8
Rathfarnham Castle		75·0	37	i 11 39	+ 3	e 21 18	sS	i 12 3	pP	e 37·5
Toledo		75·1	51	i 11 42	+ 5	i 21 24	sS	11 57	pP	32·2
Granada		75·3	54	i 11 37a	− 1	i 21 23	sS	i 12 11	pP	38·4
Honolulu		75·8	291	e 11 47	+ 6	e 21 38	sS	e 12 9	pP	e 32·7
Almeria		76·2	54	i 11 56	PcP	i 21 36	sS	14 48	PP	38·6
Edinburgh		77·0	35	—	—	e 21 31	+ 2	—	—	—
Jersey	E.	77·2	41	—	—	e 21 51	sS	e 30 56	PKKP	37·5
Alicante		77·8	52	12 2	+10	21 58	sS	14 52	PP	e 37·5
Aberdeen	N.	77·9	33	11 54	+ 2	21 44	+ 5	—	—	31·5
Durham		77·9	36	e 12 6	pP	e 21 40	+ 1	i 27 29	SSP	—
Kew		78·3	39	i 11 59	+ 4	i 21 52	+ 9	e 12 20	pP	e 38·5
Tortosa		78·5	50	e 12 5	+ 9	22 0	sS	e 12 17	pP	e 32·5
Barcelona		79·9	49	—	—	e 22 9	+ 9	—	—	33·0
Paris		80·0	42	i 12 10	+ 6	i 22 14	sS	i 12 38	pP	36·5
Clermont-Ferrand		80·4	45	i 11 21	−45	—	—	—	—	—
Algiers Univ.	Z.	80·7	54	e 12 8	0	e 15 28	PP	e 12 33	pP	—
De Bilt		81·7	38	e 12 18	+ 5	e 22 33	sS	e 23 30	PS	e 38·0
Bergen		81·9	30	—	—	e 22 27	+ 6	33 31?	Q	50·9
Besançon		82·5	44	e 12 21	+ 4	e 12 59	sP	e 12 35	PcP	—
Neuchatel		83·1	44	e 12 20	0	—	—	—	—	—
Basle		83·6	43	e 12 25	+ 3	—	—	—	—	—
Strasbourg		83·6	42	e 12 28	+ 5	i 22 50	+12	e 12 41	pP	i 38·4
Karlsruhe		84·1	41	e 12 27	+ 2	e 22 55	+12	—	—	e 42·5
Zürich		84·1	43	e 12 31a	+ 6	e 22 58	sS	e 15 56	PP	—
Stuttgart		84·6	42	e 12 30	+ 2	e 22 57	+ 9	e 12 36	pP	37·5
Pavia		84·9	45	e 12 35	+ 6	i 23 0	+ 9	e 29 23	SS	—
Chur		85·0	44	e 12 34k	+ 4	e 23 1	+ 9	—	—	e 46·8
Salo	Z.	85·8	45	e 12 38	+ 4	e 22 59	− 1	e 13 11	pP	—
Jena		85·9	40	e 12 37	+ 3	e 23 13	+12	e 16 14	PP	—
Copenhagen		86·0	35	e 12 39	+ 4	i 23 15	+13	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Prato		86·3	47	e 12 47	+ 11	i 23 19	+15	—		—	—
Bologna		86·4	46	e 12 49	pP	e 23 21	sS	e 23 55		sS	—
Florence		86·5	47	12 47	pP	23 14	+ 8	24 14		PS	—
Cheb		86·5	40	e 13 10	pP	e 23 19	sS	e 16 24		PP	—
Potsdam		86·7	38	e 13 1	pP	i 23 19	sS	i 24 21		PS	e 36·5
Collmberg		86·8	39	e 12 41	+ 3	e 23 21	sS	—		—	e 36·0
Rome		87·6	48	e 12 47	+ 5	e 23 17	0	e 16 2		PP	—
Prague		87·8	40	e 12 50	+ 7	e 23 14	− 5	e 13 9		pP	e 36·0
Triest		88·0	45	e 13 4	pP	i 23 32	ScS	e 13 38		sP	e 36·8
Upsala		88·1	30	e 13 59	?	e 23 17	− 4	i 15 51		PP	e 38·5
Ogyalla		90·7	41	e 13 2?	+ 5	e 24 0	sS	e 13 24		pP	—
Budapest		91·3	42	e 13 43	pP	e 23 32	[+ 8]	—		—	e 38·5
Taranto		91·4	49	12 35?	−25	e 23 35	[+10]	e 37 31		Q	e 40·5
Kalossa		91·5	42	e 13 41	pP	—	—	—		—	—
Helsinki		91·6	28	—	—	e 23 43	ScS	e 24 41		PS	e 37·5
Skalnate Pleso		91·7	40	e 13 7	+ 5	e 23 35	[+ 8]	e 13 39		sP	e 36·0
Belgrade		92·8	44	e 13 41k	sP	i 23 58	− 6	e 17 11		PP	e 44·4
Pulkovo		94·3	28	e 13 29	pP	i 24 0	−17	e 17 8		PP	—
Sofia		95·3	46	e 13 55	sP	—	—	—		—	—
Bucharest		96·8	43	—	—	e 24 3	[+ 8]	e 44 8		Q	45·5
Kishinev		97·9	40	e 13 45	+15	24 11	[+11]	17 43		PP	—
Istanbul		99·9	46	e 11 31?	?	e 24 24	[+14]	—		—	—
Yalta		102·2	42	e 14 9	pP	e 24 33	[+11]	e 18 20		PP	—
Helwan	N.	105·1	57	—	—	e 24 55	[+20]	e 28 13		PPS	—
Wellington		105·7	229	—	—	e 24 56	sS	e 28 36		PPS	49·3
Christchurch		107·0	226	—	—	e 25 5	[+22]	e 27 41		PS	e 49·6
Ksara		107·5	52	e 18 23?	[+ 4]	—	—	—		—	—
Sverdlovsk		108·9	21	18 52	PP	25 4	[+13]	26 23		S	—
Tiflis		110·4	40	e 18 23	[− 2]	—	—	—		—	—
Lenkoran		114·6	42	e 20 18?	PP	—	—	—		—	—
Irkutsk		120·9	356	e 20 25	PP	—	—	—		—	—
Vladivostok		122·2	332	e 20 25?	PP	e 26 53	SKKS	e 36 49		SS	—
Mary		123·4	35	e 18 56	[+ 6]	—	—	—		—	—
Lunacharskoe		124·5	27	e 20 49	PP	—	—	—		—	—
Tashkent		124·5	27	e 20 34	PP	e 27 51?	SKKS	e 22 18		PKS	—
Riverview		125·4	233	e 21 20	pPP	e 28 3	SKKS	e 38 17		SSP	e 58·4
Frunse		125·5	23	e 20 47	PP	e 30 23	SKSP	23 23		PPP	—
Andijan		126·4	25	20 57	PP	—	—	—		—	—
Fergana		126·4	25	e 19 1	[+ 5]	—	—	e 20 57		PP	—
Stalinabad		126·5	29	i 19 3	[+ 7]	27 57	SKKS	21 3		PP	—
Obi-garm		126·8	29	i 19 4	[+ 8]	—	—	21 3		PP	—
Naryn		127·3	21	e 19 8	[+11]	—	—	i 21 2		PP	—
Kulyab		127·5	29	e 19 9	[+11]	—	—	—		—	—
Nanking		137·2	336	e 20 57	?	e 27 18	[+60]	—		—	—
New Delhi	N.	138·6	29	19 48	[+30]	29 18	SKKS	23 0		PP	—
Bombay		143·2	44	e 19 29	[+ 2]	e 41 58	SS	26 18		PPP	66·8
Calcutta	E.	148·7	19	19 42	[+ 6]	42 3	SS	23 19		PP	—
Manila		149·9	316	e 19 42?	[+ 4]	—	—	—		—	—
Kodaikanal	E.	152·1	51	e 20 13	PKP_2	—	—	—		—	—
Djakarta		172·8	—	21 53	PKP_2	—	—	—		—	—

Additional readings :—
Bogota iP_g =2m.31s., iSEN =3m.43s.
San Juan i =4m.32s., iP_cP =8m.42s.
Fort de France SS =9m.11s.
Tacubaya e =9m.4s.
La Paz iPPZ =6m.31s., ipPP =6m.47s., iSS =11m.40s., iS_cS =17m.15s.
Columbia esS? =10m.47s.
Bermuda iP_cP =8m.32s., i =10m.10s.
St. Louis iPP? =7m.43s., i =11m.12s.
Florissant iPPP? =7m.44s.
Pennsylvania isP =7m.17s., iEN =7m.37s., iPP =7m.52s., isPP =8m.16s.
Fordham iSS =14m.49s.
Palisades e =11m.38s., eSS =14m.41s.
Cleveland eE =11m.52s., iSE =12m.10s., iSSE =14m.15s.
Chicago isS? =12m.49s.
Weston esS =13m.52s.

Continued on next page.

Harvard ePP =8m.0s., i =8m.13s., isS =13m.9s.
Lincoln eE =8m.6s., esPPE =8m.59s.
Tucson iPP =8m.29s., isS =13m.35s.
Shawinigan Falls PPPN =9m.41s., SSN =17m.13s.
Seven Falls SSSE =17m.24s.
Rapid City ePPE =9m.21s., ipPPE =9m.45s., esSE =14m.26s., eE =15m.51s.
Pierce Ferry i =7m.49s., iPcP =9m.46s.
Salt Lake City i =15m.24s., iScS? =18m.2s.
Pasadena iEZ =8m.39s., iPcPZ =9m.27s., iZ =9m.46s., iPPZ =9m.57s., iScPZ = 13m.10s., iSEN =14m.30s., iEN =15m.28s., eZ =17m.50s.
Logan epPP =10m.20s., ePPP =10m.38s., e =11m.18s., iS =14m.33s., isS =15m.27s., i =17m.30s.
China Lake iZ =8m.28s.
Fresno epPP?N =10m.33s., ePPP?E =10m.57s., eZ =11m.45s., eN =12m.40s., eZ = 15m.5s. and 19m.37s.
Bozeman ePP =10m.25s., esPP =10m.53s., e =12m.4s., eScS =17m.55s.
La Plata PPE =10m.25s., PPPN =10m.55s., N =11m.55s., PPP?E =12m.13s., PcP?E = 12m.49s., PSN =16m.7s., SSN =18m.49s., SSSN =20m.37s.
Butte eScS =18m.14s.
Reno eZ =9m.26s., eEN =9m.36s., eE =18m.38s.
Lick eEN =8m.44s., esPZ =9m.5s., ePPP?Z =11m.31s.
Berkeley iZ =8m.44s., esPZ =9m.9s., ePcPZ =10m.5s., eSSZ =19m.25s.
Saskatoon SS =19m.43s.
Ukiah ePP? =11m.1s.
Arcata eZ =11m.0s.
Seattle iPP =11m.21s., ePPP =12m.31s., ePcS =14m.2s., eScS =19m.10s., eSS = 19m.34s., eSSS =21m.39s., and many other unidentified readings.
Ivigtut 19m.44s.
Sitka eSS? =24m.7s.
Resolute Bay PPZ =13m.15s., PPPE =15m.5s., eE =19m.7s., PSE =20m.13s.
Scoresby Sund i =11m.32s. and 21m.24s., SS =25m.52s.
College ePP =14m.13s.
Malaga PS =21m.55s., SS =26m.11s.
Rathfarnham Castle eZ =12m.19s., eEN =16m.18s., 20m.20s., 21m.58s., and 25m.30s.
Toledo PP? =14m.25s.
Granada iPP =14m.44s., pPP =15m.2s., PPP =16m.5s., pPPP =16m.38s., PS = 22m.11s., iSS =26m.23s.
Honolulu eS? =22m.7s., eSS =26m.17s.
Almeria SS =26m.40s.
Alicante PPP =16m.34s., ScS =22m.26s., PS =22m.42s., PPS =23m.4s., SS =26m.56s., SSS =30m.4s., Q =33m.32s.
Aberdeen iN =13m.45s. and 18m.52s.
Kew ePPE =14m.47s., epP =22m.13s., ePS =23m.13s., eEN =25m.33s., eSSEN = 28m.47s., eQEN =33·5m.
Tortosa ePE =12m.10s., pP?N =12m.43s., ScS?N =22m.10s., PSN =22m.37s.
Paris iPcP =12m.24s., iPP =15m.6s., ipPP? =15m.36s., iSKS =22m.28s., ScS =22m.41s., iPS =22m.56s., iPPS =23m.26s., iSS =27m.40s., iSSS =30m.23s., Q =33·5m. with many unidentified i readings.
Algiers Univ. esPZ =12m.49s., eZ =13m.24s., epPPZ =15m.51s.
De Bilt eSS =28m.1s.
Bergen eN =23m.23s. and 29m.3s.
Strasbourg esP? =14m.4s., e =14m.9s., ePP =16m.9s., ePPP =17m.39s., isS? =23m.21s., iPS =23m.39s., iPPS =24m.16s., i =24m.31s., and 25m.22s., iSS =28m.24s., esSS =29m.6s., eSSS =31m.56s.
Stuttgart e =14m.13s., ePP =15m.27s., e =16m.5s., ePPP =18m.1s., ePS =23m.59s., e =24m.51s., eSS =28m.43s., e =33m.43s.
Pavia e =24m.51s.
Jena ePN =12m.40s., eE =12m.53s., eN =13m.11s., eE =13m.50s., ePS?N =24m.11s.
Florence e =14m.53s.
Cheb e =13m.21s., 20m.45s., 22m.28s., and 24m.42s., eSS =28m.55s.
Potsdam iSN =23m.25s., iE =23m.44s.
Rome eN =23m.34s., iPSN =24m.16s., eSSN =29m.27s.
Prague esP =13m.18s., ePP =16m.20s., epPP =16m.38s., esPP =16m.56s., eSKS?E = 22m.53s., eS =23m.28s., epS =23m.52s., esS =24m.5s., eSP =24m 31s , eSS = 29m.11s., eSSS =33m.1s., and other unidentified e readings.
Triest esS =24m.28s., ePS =24m.38s.
Upsala eE =20m.3s., iSKS =23m.30s.?, iN =24m.6s., ePSN =24m.35s., eN =27m.57s., eSSS?N =33m.31s., eQN =36m.31s.
Ogyalla eN =14m.53s., ePP =16m.46s., e =17m.46s., ePPP =18m.46s., esS =24m.24s., e =25m.37s. and 26m.43s., eSS =29m.55s., esSS? =30m.31s.
Budapest ePE =13m.51s.
Helsinki eE =24m.0s.
Skalnate Pleso ePP =16m.43s., epPP =17m.7s., ePPP =18m.57s., eSKKS =24m.31s.?, ePS =25m.9s., eSS =30m.13s., esSS =30m.55s. and other unidentified e readings.
Belgrade eNW =27m.25s.
Pulkovo SKKS =24m.17s., PS =26m.12s.
Bucharest eE =24m.7s., eN =26m.27s., eE =27m.11s., eN =33m.45s.
Kishinev PS =26m.24s.

Continued on next page.

Helwan eN =26m.7s., eE =33m.37s.
Wellington Q =45m.41s.
Christchurch ePPS =29m.6s., SSEN =33m.41s., SSSEN =38m.31s., eQN =44m.31s.
Sverdlovsk SS =34m.1s.
Vladivostok iSSS =40m.25s.
Tashkent eSS =37m.25s.
Riverview eE =31m.6s. and 33m.33s., eN =33m.43s., eE =41m.9s.
Stalinabad PS =31m.23s.?.
Nanking e =23m.26s.
New Delhi PPPN =26m.13s., PSN =33m.20s., PPSN =35m.21s., SSN =41m.33s.
Bombay PPPN =26m.24s., eSSN =42m.35s., SSSE =47m.17s., SSSN =48m.6s., QE = 60m.53s.
Calcutta SSPE =42m.46s., SSSE =47m.14s.
Long waves were also recorded at Auckland, Brisbane, and Tananarive.

Jan. 6d. Readings also at 0h. (Apia), 1h. (Mount Wilson, Riverside, China Lake, Tucson, Pierce Ferry, and Hungry Horse), 2h. (Mount Wilson, Palomar, China Lake, Tucson, Pierce Ferry, Mineral, Shasta Dam, Hungry Horse, Tamanrasset, Sverdlovsk, and near Mary), 3h. (Chatra and near Manila), 5h. (Dehra Dun), 6h. (Tamanrasset), 7h. (Huancayo, Bogota, and Hyderabad), 9h. (Tacubaya, and near Manila), 10h. (Apia, Przhevalsk, near Chilisk, Ili, Krasnogorka, and Kurmenty), 13h. (College), 14h. (Apia and near Balboa Heights), 15h. (Apia, Bogota, Galerazamba, Huancayo, La Paz, Tacubaya, Weston, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Pierce Ferry, Lick, Mineral, Shasta Dam, Hungry Horse (2), College, Stuttgart, and near Manila), 16h. (Apia, Istanbul, and Tacubaya), 17h. (Huancayo, La Paz, La Plata, Tacubaya, Shasta Dam, Hungry Horse, College (2), Rome, Chatra, and Nanking), 18h. (Riverview, Christchurch, Kaimata, Wellington, La Paz, La Plata, Hungry Horse, College, Resolute Bay, and Rome), 19h. (Brisbane, De Bilt, Kew, Paris, Pavia, Granada, Almeria, Alicante, La Paz, near Huancayo, and near Ottawa), 20h. (Bogota, Shasta Dam, Hungry Horse, and College), 21h. (College), 22h. (College and near Klyuchi), 23h. (Khorog (2), Samarkand, near Ashkabad, near Dzhergetal, Kulyab, Obi-garm, and Stalinabad).

Jan. 7d. 18h. Kamchatka Region. These observations do not afford a determination of epicentre.

Klyuchi iP =32m.5s., eS_g =32m.33s.
Vladivostok eP =36m.14s., S =40m.28s.
College iP =37m.7s., ipP? =37m.49s.
Kabansk eP =37m.50s., eS =43m.0s.
Hungry Horse iP =38m.19s., i =40m.29s.
Shasta Dam iP =38m.25s.
Pierce Ferry eP? =39m.13s., i =41m.27s.
Sverdlovsk eP =39m.48s., eS =46m.51s.
Mineral ePZ =40m.30s.a, iZ =41m.11s.
Reno ePZ =40m.44s., eZ =40m.58s.
Lick ePZ =40m.54s.k, eZ =41m.1s. and 41m.20s.
Fresno ePZ =40m.55s.
Tinemaha ePZ =41m.1s., iZ =41m.18s. and 41m.29s.
China Lake ePZ =41m.10s., iZ =41m.28s. and 41m.38s.
Overton eP?Z =41m.27s.
Pasadena eZ =41m.33s.
Riverside eZ =41m.35s.
Tucson eP? =41m.53s., e =42m.5s.
Tiflis eP =42m.25s.
Ottawa eP =42m.31s.
Jena eN =42m.48s. and 43m.8s.
Stuttgart eZ =43m.3s.a.
Strasbourg eP =43m.5s.a, e =43m.30s., e? =44m.29s.
Paris iP =43m.10s., eL =68m.0s.
Besançon iP =43m.15s., e =44m.56s.
Ksara e =43m.36s.
Long waves were also recorded at Bombay, Pavia, and Granada.

Jan. 7d. Readings also at 0h. (Hungry Horse and College), 3h. (Hungry Horse and College), 4h. (near Seattle and Victoria), 5h. (Merida, Puebla, Tacubaya, Vera Cruz, Mount Wilson, Riverside, China Lake, Tinemaha, Tucson, Pierce Ferry, Lick, Reno, and Mineral), 8h. (Huancayo, Bogota, La Paz, La Plata, and near Manila), 9h. and 10h. (Stuttgart), 11h. (Tacubaya), 13h. (Hungry Horse and College), 14h. (Tacubaya and near Balboa Heights), 15h. (Huancayo, La Paz, Bogota, Tamanrasset, Tucson, Lick, Mineral, Reno, Hungry Horse, and College), 16h. (Edinburgh and La Paz), 17h. (College, near Balboa Heights, and near Apia), 18h. (Christchurch and Hungry Horse), 19h. (Ashkabad), 20h. (Lick and Mineral), 21h. (Ashkabad, Bogota, and near Huancayo). 23h. (Scoresby Sund).

Jan. 8d. 17h. Near Flores or Sumbawa.

Djakarta eP =55m.13s., iS =58m.22s.
Brisbane iPZ =59m.38s.k.
Perth i =61m.13s., 64m.20s., 70m.3s., and 76m.3s.
Kurmenty eP =62m.55s.
Andijan P =62m.58s., S =71m.45s.
Kulyab eP =63m.4s.
Fergana eP =63m.6s.
Obi-garm iP =63m.9s.
Stalinabad iP =63m.9s.
Tashkent eP =63m.17s., eS =72m.15s.
Samarkand eP =63m.21s.
Tchimkent iP =63m.21s.
Mary iP =63m.37s.
Ashkabad eP =63m.53s., S =73m.20s.
Riverview iN =64m.0s., iE =65m.54s., eLE =71·7m., iScS?E =75m.29s.
Sverdlovsk P =64m.37s., eS =74m.43s.
Abastumanj eP =65m.4s.
Ksara eP =65m.39s., eS =76m.12s.
Kodaikanal eE =65m.48s.
Hungry Horse iP =71m.18s.
Tinemaha ePZ =71m.21s.
China Lake iPZ =71m.22s., iZ =71m.34s.
Pasadena ePZ =71m.22s., eZ =71m.35s.
Tamanrasset Z =72m.0s.
Lunacharskoe eS =72m.13s.
Long waves were also recorded at Bombay, Christchurch, and Wellington.

Jan. 8d. 18h. 32m. 28s. Epicentre 35°·6N. 140°·0E. Depth of focus 0·005.
(as on 1946, Feb. 20d.).

Intensity VII-VIII at Tsuda Sengokubara Daibutsu, Kanagawa Prefecture ; VI at Tokyo, Yokohama, and Tyosi ; V at Mera, Mito, Osima, Misima, Kumagaya, Titibu, Hunatu, and Shizuoka ; IV at Utunomiya, Kohu, Tukubasan, Maebasi, Shirakawa, Iida, and Hatidyozima ; II-III at Nagatsuro, Oiwake, Onahama, Nagano, Hukusima, Inawashiro, and Matusiro. Epicentre 35°·4N. 140°·1E., depth 40km.

Seismo. Bull, Cent. Met. Obs., Japan, 1951, Tokyo, 1951, pp.9-11, with chart of intensities.

$A = -·6243$, $B = +·5239$, $C = +·5795$; $\delta = +4$; $h = 0$;
$D = +·643$, $E = +·766$; $G = -·444$, $H = +·373$, $K = -·815$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tokyo	0·2	298	0 10a	− 1	0 18	− 1	—	—	—
Yokohama	0·3	240	0 12	0	0 19	− 1	—	—	—
Tukubasan	0·6	7	0 14	0	0 24	− 1	—	—	—
Mera	0·7	191	0 11k	− 4	0 19	− 8	—	—	—
Tyosi	0·7	79	0 15	0	0 21	− 6	—	—	—
Kumagaya	0·8	318	0 17a	0	0 32	+ 3	—	—	—
Titibu	0·8	297	0 18a	+ 1	0 32	+ 3	—	—	—
Mito	0·9	26	0 11a	− 7	0 24	− 7	—	—	—
Hunatu	1·0	264	0 18a	− 1	0 33	0	—	—	—
Misima	1·0	241	0 16a	− 3	0 29	− 4	—	—	—
Osima	1·0	211	0 16k	− 3	—	—	—	—	—
Utunomiya	1·0	354	0 19a	0	0 34	+ 1	—	—	—
Maebasi	1·1	317	0 19	− 1	0 36	0	—	—	—
Kohu	1·2	272	0 17	− 5	0 32	− 6	—	—	—
Oiwake	1·4	302	0 24a	0	—	—	—	—	—
Shirakawa	1·5	7	0 26a	0	0 52	+ 7	—	—	—
Shizuoka	1·5	244	0 25a	− 1	0 42	− 3	—	—	—
Onahama	1·5	29	0 26a	0	0 46	+ 1	—	—	—
Matusiro	1·7	303	0 32a	+ 4	0 59	+ 9	—	—	—
Iida	1·8	267	0 30	0	0 56	+ 4	—	—	—
Matumoto	1·8	291	0 33a	+ 3	0 57	+ 5	—	—	—
Nagano	1·8	306	0 32	+ 2	0 55	+ 3	—	—	—
Omaesaki	1·8	236	0 27a	− 3	0 49	− 3	—	—	—
Inawashiro	2·0	3	0 36	+ 4	1 6	+ 9	—	—	—
Hamamatu	2·1	245	0 31	− 3	0 51	− 8	—	—	—

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Takada	2·1	317	0 34	0	1 8	+ 9	—	—	—
Hukusima	2·2	10	0 36a	+ 1	1 8	+ 6	—	—	—
Takayama	2·3	284	0 36	− 1	1 8	+ 4	—	—	—
Niigata	2·4	342	0 44	+ 6	1 10	+ 3	—	—	—
Hatidyozima	2·5	183	0 35	− 4	0 57	−12	—	—	—
Nagoya	2·5	260	0 40a	+ 1	1 13	+ 4	—	—	—
Toyama	2·5	296	0 43a	+ 4	1 12	+ 3	—	—	—
Gihu	2·6	266	0 44k	+ 3	1 22	+10	—	—	—
Aikawa	2·8	330	0 44	0	1 19	+ 2	—	—	—
Sendai	2·8	15	0 44	0	1 20	+ 3	—	—	—
Kanazawa	2·9	289	0 48	+ 3	1 30	+11	—	—	—
Ibukisan	3·0	266	0 46	− 1	1 35	+13	—	—	—
Isinomaki	3·0	20	0 48	+ 1	1 17	− 5	—	—	—
Kameyama	3·0	255	0 48a	+ 1	1 35	+13	—	—	—
Tu	3·0	253	0 44	− 3	1 22	0	—	—	—
Hikone	3·1	264	0 50	+ 2	1 29	+ 5	—	—	—
Hukui	3·1	278	0 50	+ 2	1 40	+16	—	—	—
Wazima	3·1	306	0 50	+ 2	1 39	+15	—	—	—
Tsuruga	3·2	271	0 50	+ 1	1 30	+ 3	—	—	—
Kyoto	3·5	261	0 53	− 1	1 38	+ 4	—	—	—
Owase	3·5	245	0 52	− 2	1 44	+10	—	—	—
Mizusawa	3·7	14	e 0 55	− 1	1 38	− 1	—	—	—
Osaka	3·8	257	0 56a	− 2	1 37	− 5	—	—	—
Akita	4·1	1	1 6	+ 4	1 56	+ 7	—	—	—
Kobe	4·1	258	1 0a	− 2	1 53	+ 4	—	—	—
Siomisaki	4·1	241	1 0	− 2	1 46	− 3	—	—	—
Morioka	4·2	13	1 4	+ 1	1 52	0	—	—	—
Toyooka	4·2	270	1 41	?	2 52	?	—	—	—
Wakayama	4·2	252	0 32?	−31	1 17?	−35	—	—	—
Miyako	4·3	21	1 4	− 1	2 3	+ 9	—	—	—
Sumoto	4·4	255	1 5a	− 1	2 3	+ 6	—	—	—
Himeji	4·7	258	1 20	+10	2 16	+12	—	—	—
Tottori	4·7	271	1 31	+21	2 41	+37	—	—	—
Hatinohe	5·1	14	1 15	− 1	2 0	−14	—	—	—
Aomori	5·2	7	1 22	+ 5	—	—	—	—	—
Muroto	5·3	246	1 19	0	2 51	+32	—	—	—
Yonago	5·4	270	1 29	+ 9	2 34	+12	—	—	—
Koti	5·7	251	1 23	− 1	2 37	+ 8	—	—	—
Matuyama	6·2	256	1 29	− 2	2 48	+ 7	—	—	—
Hirosima	6·3	261	1 32	0	3 4	+20	—	—	—
Simidu	6·4	246	1 31	− 3	3 23	+37	—	—	—
Hamada	6·5	266	1 31	− 4	3 15	+26	—	—	—
Urakawa	6·9	18	1 41	0	3 2	+ 3	—	—	—
Ooita	7·3	254	1 51	+ 5	—	—	—	—	—
Sapporo	7·5	8	2 10	+21	3 44	+30	—	—	—
Miyazaki	8·0	245	1 58	+ 2	3 58	+32	—	—	—
Hukuoka	8·1	258	2 1	+ 4	3 52	+24	—	—	—
Kumamoto	8·2	253	1 59	0	4 23	+52	—	—	—
Saga	8·3	256	2 5	+ 5	4 5	+32	—	—	—
Unzendake	8·6	253	2 4	0	4 41	+60	—	—	—
Kagosima	8·8	246	2 9k	+ 2	4 48	+62	—	—	—
Nagasaki	8·9	254	2 12	+ 4	4 45	+57	—	—	—
Nemuro	8·9	28	2 4	− 4	3 38	−10	—	—	—
Yakusima	9·5	240	2 28	+11	4 22	+19	—	—	—
Tomie	9·8	255	2 30	+ 9	5 20	+70	—	—	—
Vladivostok	9·8	323	i 2 21	0	i 4 21	+11	—	—	—
Wakkanai	9·9	7	2 5	−17	4 38	+26	—	—	—
Nanking	18·0	265	4 9	+ 2	e 7 35	+12	i 4 23	pP	i 9·0
Klyuchi	25·1	27	e 5 23	+ 3	—	—	i 6 6	PP	—
Kabansk	28·8	317	5 53	− 1	10 47?	+ 9	—	—	—
Irkutsk	30·2	315	e 6 6	0	11 10?	+10	—	—	—
Chatra	45·6	275	e 8 16	0	—	—	—	—	—
Kurmenty	47·4	299	i 8 30	0	—	—	—	—	—
Ili	48·0	302	i 8 35	+ 1	—	—	—	—	—
Almata	48·3	300	i 8 38	+ 1	i 15 37	+ 6	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rybach'e		49·1	299	e 8 43	0	15 47	+ 5	—	—	—
Naryn		49·4	298	e 8 46	+ 1	—	—	—	—	—
Krasnogorsk		49·5	301	i 8 45	− 1	—	—	—	—	—
Frunse		50·0	301	i 8 50	0	i 16 2	+ 8	—	—	—
College		50·9	32	i 8 57	0	—	—	e 9 14	pP	e 19·4
Andijan		52·2	297	9 7	+ 1	i 16 31	+ 6	—	—	—
Fergana		52·8	297	i 9 11	0	e 16 38	+ 5	—	—	—
New Delhi		52·9	282	i 9 10	− 2	i 16 32	− 2	18 53	ScS	—
Tchimkent		53·7	301	i 9 18	0	i 16 51	+ 6	—	—	—
Lunacharskoe		54·3	300	e 9 22	0	e 16 58	+ 5	—	—	—
Tashkent		54·3	300	i 9 21	− 1	i 16 55	+ 2	—	—	—
Obi-garm		54·8	296	i 9 25	− 1	i 17 4	+ 4	—	—	—
Sverdlovsk		55·5	320	9 30	− 1	17 11	+ 2	—	—	—
Stalinabad		55·6	297	e 9 32	+ 1	i 17 15	+ 5	—	—	—
Poona	E.	60·3	273	10 4	0	e 18 16	+ 4	18 28	PS	—
Bombay		60·9	274	e 10 8	0	e 18 22	+ 2	—	—	—
Mary		61·0	298	i 10 8	− 1	—	—	—	—	—
Brisbane	z.	63·9	167	i 10 28k	0	—	—	—	—	—
Moscow		67·7	324	e 10 52	− 1	e 19 46	+ 2	—	—	—
Baku		68·1	305	—	—	e 19 50	+ 2	—	—	—
Pulkovo		68·8	330	e 10 56	− 3	19 58	+ 1	—	—	—
Seattle		69·3	46	i 11 4k	+ 2	e 11 41	sP	i 11 29	pP	—
Lenkoran		69·6	305	11 2	− 2	—	—	—	—	—
Helsinki		70·8	333	—	—	e 20 49	+29	—	—	e 40·5
Tiflis		70·8	308	e 11 13	+ 1	—	—	—	—	—
Gori		71·1	309	e 11 15	+ 2	—	—	—	—	—
Abastumanj		72·0	309	11 20	+ 1	—	—	—	—	—
Zugdidi		72·2	310	e 11 23	+ 3	—	—	—	—	—
Scoresby Sund		73·4	355	i 11 28	+ 1	—	—	e 11 44	pP	—
Hungry Horse		73·6	42	i 11 29	+ 1	e 22 9	PPS	i 11 42	pP	—
Mineral	z.	73·6	52	i 11 28k	0	—	—	i 11 39	pP	—
Berkeley	z.	74·5	55	i 11 33k	0	—	—	i 11 47	pP	—
Lick		75·2	55	i 11 37k	0	—	—	e 11 48	pP	—
Reno		75·2	52	e 11 38k	+ 1	—	—	e 11 51	pP	—
Yalta		75·8	315	—	—	e 21 18	+ 2	—	—	—
Fresno	z.	76·8	54	e 11 46k	0	—	—	e 11 56	pP	e 35·5
Kishinev		77·2	320	11 48	− 1	21 33	+ 1	—	—	—
Tinemaha		77·6	54	i 11 51k	0	—	—	—	—	—
China Lake	z.	78·7	54	i 11 57k	0	e 12 21	sP	i 12 11	pP	—
Copenhagen		78·7	333	i 11 57k	0	e 21 49	+ 1	—	—	41·5
Logan		78·8	47	e 11 57	0	—	—	e 12 15	pP	—
Pasadena		79·3	56	i 12 0k	0	i 12 29	sP	i 12 17	pP	—
Riverside		80·0	56	i 12 3k	− 1	—	—	i 12 18	pP	—
Boulder City		80·5	53	i 12 7	0	—	—	—	—	—
Palomar		80·7	56	i 12 8k	0	i 12 33	sP	i 12 22	pP	—
Istanbul	z.	80·8	315	e 12 11	+ 3	—	—	e 15 15	PP	—
Ksara		81·0	305	i 12 20k	+11	i 23 13	PS	—	—	—
Collmberg	z.	81·8	330	e 12 11	− 2	—	—	e 15 20	PP	—
Prague		82·1	329	e 12 16	+ 1	e 22 43	+20	i 12 35	pP	—
Jena		82·6	330	e 12 17	0	—	—	e 12 37	pP	—
Belgrade		83·0	322	e 12 20a	0	e 22 39	+ 7	i 12 57	PcP	e 52·3
Cheb		83·0	330	e 12 50	+30	e 22 37	+ 5	—	—	—
Stuttgart	z.	85·3	330	i 12 32k	+ 1	e 22 58	+ 3	e 12 47	pP	e 45·5
Tucson		85·4	53	i 12 32	0	—	—	i 12 49	pP	—
Triest		85·7	326	e 12 32	− 1	e 23 1	+ 2	14 53	PP	—
Strasbourg		86·0	331	e 12 35	0	e 22 52	[0]	e 12 49	pP	e 42·5
Helwan		86·5	305	e 12 38	+ 1	23 2	− 4	16 1	PP	—
Kew		86·6	337	e 12 54	pP	e 23 10	+ 3	—	—	e 42·5
Zürich		86·6	330	e 12 40a	+ 3	—	—	e 15 53	PP	—
Rathfarnham Castle		86·8	341	i 13 1	pP	e 23 8	− 1	e 17 1	PP	e 39·5
Basle		86·9	330	e 12 39	0	—	—	—	—	—
Besançon		87·8	330	e 12 42	− 1	—	—	e 16 16	PP	—
Paris		87·8	334	i 12 45	+ 2	e 24 24	SP	i 12 59	pP	e 46·1
Rome		89·1	324	e 12 51?	+ 2	e 23 37	+ 6	e 16 19	PP	—
St. Louis		92·7	37	e 13 7	+ 1	e 23 38	[+ 6]	e 23 56	SKKS	e 31·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ottawa		93·2	24	e 13 8	0	—	—	—	—	—
Alicante		97·8	330	12 35	−54	—	—	—	—	e 49·5
Almeria		99·9	330	14 48	+69	—	—	—	—	50·0
Granada		100·1	331	15 4k	?	—	—	e 19 49	PP	49·7
Tamanrasset	z.	107·7	316	e 17 42	PKP	—	—	e 18 39	PP	—
Huancayo		140·4	62	e 19 17	[− 5]	—	—	—	—	—
La Paz		148·5	59	i 19 41k	[+ 5]	35 50	PPS	i 19 52	pPKP	70·5

Additional readings :—
Mizusawa PE =58s.
Nanking iEN =7m.51s.
Poona PPSE =18m.36s.
Seattle i =11m.10s., iPcP =11m.20s., e =11m.36s., isPcP =11m.55s., e =12m.17s.
Mineral iZ =12m.48s.
Berkeley eZ =11m.56s.
Reno eE =12m.21s.
Pasadena iPPZ =15m.17s.
Prague i =13m.4s., e =14m.32s. and 15m.11s.
Jena ePN =12m.20s., eN =13m.17s.
Stuttgart eZ =12m.52s., 12m.58s., and 13m.6s.
Tucson e =16m.17s.
Triest eS =23m.16s.
Strasbourg i =13m.43s., e =26m.32s.
Helwan eZ =12m.50s., eN =23m.38s.
Rathfarnham Castle eSEN =23m.52s.
Besançon e =12m.58s.
Paris isP? =13m.6s., i =13m.12s., 13m.26s., and 13m.29s., iPP =16m.11s., i =20m.44s., 22m.4s., and 22m.18s.
Rome eSKSN =23m.13s., eSSN =29m.41s.
La Paz iPP =23m.8s.
Long waves were also recorded at De Bilt and Pavia.

Jan. 8d. 21h. Undetermined shock.

Auckland eN =41m.59s.
Wellington eP =44m.27s., iZ =45m.17s., eL =46m.50s.
Brisbane iPZ =44m.27s.k, iSEN =48m.34s., iSSE =49m.5s.
Cobb River ePE =45m.
Christchurch eP =45m.25s.
Kaimata ePNE =45m.31s.
Riverview iE =47m.5s., iZ =47m.9s., eLZ =53·2m.
Nanking P =48m.18s.k, i =48m.33s.
Kabansk S =50m.35s.
Chatra e =50m.41s.
College iP =51m.54s.
Andijan P =52m.8s.
Tchimkent iP =52m.19s., eS =60m.3s.
Berkeley ePZ =52m.33s., eZ =52m.43s.
Victoria eZ =52m.34s.
Lick ePZ =52m.35s.a, eZ =52m.56s.
Mineral ePZ =52m.36s.a, iZ =52m.45s. and 53m.6s.
Seattle iP =52m.40s.k, i =53m.19s.
Fresno ePZ =52m.42s.a, ePPZ =56m.12s.
Pasadena ePZ =52m.43s., iP =52m.47s.
Reno eP =52m.44s.a.
Riverside ePZ =52m.44s., iPZ =52m.50s.
Palomar iPZ =52m.44s., iP =52m.53s.
China Lake ePZ =52m.49s.
Tinemaha iPZ =52m.49s.
Tucson iP =53m.0s.
Pierce Ferry iP =53m.2s.
Hungry Horse iP =53m.3s., e =59m.41s.
Ottawa eP =58m.26s.k.
Washington iPKPZ =58m.30s.
Stuttgart ePKPZ =58m.33s.a, eZ =58m.48s., ePPZ =60m.46s.
Strasbourg ePKP =58m.35s.
Besançon ePKP =58m.38s.
Paris iPKP =58m.42s.
Huancayo ePKP =58m.45s., e =85m.24s.
La Paz PKPZ =58m.51s.
Algiers Univ. ePKPZ =58m.55s., eZ =59m.12s.
San Juan iPKP =58m.56s., i =59m.2s.
Tamanrasset iPKPZ =59m.1s., eZ =61m.9s., ePPZ =62m.13s., eSKPZ =62m.38s., ePPPZ =65m.19s., eSKSZ =65m.57s.
Ksara ePKP =59m.11s., e =76m.3s.?
Fort de France ePKP =59m.15s.
Long waves were also recorded at Granada.

Jan. 8d. Readings also at 0h. (near Apia), 1h. (Hungry Horse and near Chatra), 2h. (Hungry Horse), 3h. (Chatra), 6h. (near Ashkabad (2)), 7h. (near Andijan, Chilisk, Frunse, Kurmenty, and Krasnogorka), 8h. (Apia, College, Chatra, Ashkabad (2), Ksara, Andijan, Frunse, Krasnogorka, Lunacharskoe, Mary, near Dzhergetal, Fergana, Khorog, Kulyab, Obi-garm, Stalinabad, Tashkent, and Tchimkent), 9h. (Mineral, Hungry Horse, and near College), 10h. (Ashkabad), 11h. (Ashkabad, Auckland, Kaimata, Tuai, and Wellington), 12h. (Riverview, Christchurch, Cobb River, New Plymouth, Brisbane, Kodaikanal, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Lick, Fresno, Mineral, Reno, Shasta Dam, Ksara, Huancayo, La Paz, and Tamanrasset), 13h. (Granada, Paris, and Rome), 14h. (Auckland, Tuai, Huancayo, and near Tortosa), 15h. (Christchurch, Cobb River, Kaimata, New Plymouth, Wellington, Brisbane, Mount Wilson, Palomar, China Lake, Tinemaha, Tucson, Pierce Ferry, Lick (2), Fresno (2), Reno, and near Ashkabad), 16h. (Alicante (3) and Stuttgart), 17h. (Stuttgart and near Stalinabad), 18h. (near Djakarta), 19h. (Chatra, Tamanrasset, and Ashkabad (2)), 20h. (near Chatra (2)), 22h. (Hungry Horse, Andijan, Fergana, near Kurmenty, near Dzhergetal, and Khorog), 23h. (Granada, Tamanrasset, and near Athens).

Jan. 9d. 0h. 27m. 58s. Epicentre 38°·8N. 20°·6E. (as on 1949, June 26d.).

Intensity IV in the Islands of Ithaca and Leucade. Epicentre 38°·7N. 20°·4E. (Strasbourg).

A. Galanopoulos.
Seismo. Institute Bull., 1951, Athens, 1952, p.12.

$A = +\cdot7314$, $B = +\cdot2749$, $C = +\cdot6240$; $\delta = -11$; $h = -1$;
$D = +\cdot352$, $E = -\cdot936$; $G = +\cdot584$, $H = +\cdot220$, $K = -\cdot781$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		2·6	109	i 0 19	?	e 1 9?	− 8	i 0 44	P	—
Taranto		3·1	304	0 54	+ 3	1 26	− 3	—	—	—
Messina		4·0	263	e 0 56k	− 8	i 1 44	− 8	e 1 19	P_g	—
Sofia	N.	4·4	27	e 1 16	P*	e 2 41	S_g	—	—	e 3·0
Belgrade		6·0	359	e 1 43a	P*	e 3 27	S_g	e 2 2	P_g	i 4·3
Rocca di Papa		6·7	299	e 1 48	+ 6	e 2 57	− 3	—	—	—
Istanbul		6·9	68	e 1 49	+ 4	—	—	—	—	i 5·0
Rome		6·9	299	e 1 45	0	i 3 21	S*	e 2 6	P*	e 3·6
Bucharest		7·0	35	e 1 50	+ 4	i 3 50	S_g	e 2 21	P_g	i 4·4
Timisoara		7·0	4	e 2 31	P_g	e 3 0	− 8	—	—	e 5·1
Triest		8·5	326	e 2 7	0	i 3 46	+ 1	—	—	i 5·1
Florence		8·6	308	e 2 25	P*	e 4 31	S*	e 4 49	S_g	—
Prato		8·8	308	e 2 33	P*	i 4 58	S_g	—	—	—
Bologna		9·0	312	e 2 32	P*	e 4 3	+ 5	—	—	e 5·6
Ogyalla		9·2	350	—	—	e 3 55?	− 8	e 4 34	S*	—
Salo		10·1	315	e 2 35	+ 6	i 4 23	− 2	i 2 59	P*	—
Kishinev		10·2	34	2 37	+ 6	—	—	—	—	—
Skalnate Pleso		10·4	359	e 3 10	P*	e 4 38	+ 6	e 5 34	S_g	e 6·0
Pavia		10·6	310	e 2 40	+ 4	e 4 37	0	e 5 29	S*	—
Chur		11·4	318	e 2 55	+ 8	e 4 55	− 1	i 5 1	SS	—
Yalta		11·6	57	e 2 51	+ 1	—	—	—	—	—
Prague		12·1	341	i 3 3	+ 6	e 5 23	+ 9	e 5 36	SSS	e 6·9
Zürich		12·3	316	e 3 6	+ 7	e 5 13	− 5	—	—	—
Helwan	z.	12·6	132	e 2 53	−10	—	—	—	—	—
Cheb		12·7	335	e 3 17?	+12	e 5 31	+ 3	—	—	e 6·9
Basle		12·9	317	e 3 13	+ 6	e 5 28	− 5	—	—	—
Neuchatel		12·9	314	e 3 7	0	—	—	—	—	—
Stuttgart		12·9	324	e 3 8	+ 1	e 5 32	− 1	e 3 18	PP	e 7·0
Ksara		13·3	107	e 3 15	+ 2	—	—	—	—	e 6·7
Karlsruhe		13·5	323	e 3 2	−13	e 5 39	− 8	e 3 37	PPP	e 7·0
Strasbourg		13·5	321	e 3 26	+11	e 5 47	0	e 6 22	SSS	e 6·9
Besançon		13·6	313	e 3 20	+ 3	e 5 51	+ 1	e 3 30	PP	—
Collmberg	z.	13·6	339	e 3 21	+ 4	—	—	e 6 31	Q	e 8·0
Jena		13·7	335	3 26	+ 8	e 5 57	+ 5	e 3 35?	PP	e 7·1
Algiers Univ.	z.	14·0	267	e 3 13	− 9	—	—	e 3 35	PP	—

Continued on next page.

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.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Potsdam		14·6	341	—	—	e 6 44?	SSS	e 8 40	PcP	e 10·0
Tortosa	N.	15·6	284	3 39	− 4	6 46	+ 9	—	—	—
Paris		16·4	313	i 3 59	+ 6	i 7 14	+18	i 4 10	PP	9·5
Alicante		16·5	275	3 47	− 7	15 42	ScS	8 59	Q	e 10·8
Zugdidi		16·6	70	e 4 11	PP	—	—	—	—	—
De Bilt		17·1	326	(e 4 2?)	0	—	—	—	—	e 4·0
Copenhagen		17·8	344	e 4 14	+ 3	i 7 43	+15	—	—	10·0
Gori		18·2	73	e 4 16?	0	e 7 46?	+ 9	—	—	—
Almeria		18·3	273	4 14	− 3	6 58	−41	4 31	PP	9·9
Tiflis		18·7	73	e 4 11	−11	e 7 55	+ 7	—	—	—
Toledo		19·1	283	i 4 19	− 8	8 34	SSS	e 4 52	PPP	10·2
Granada		19·2	274	i 4 21k	− 7	8 22	SS	4 46	PP	11·5
Kew		19·4	319	—	—	e 8 11	+ 7	—	—	e 11·7
Malaga		19·9	274	i 4 28	− 8	—	—	—	—	12·5
Moscow		20·4	29	e 4 41	0	e 8 37	+12	—	—	—
Tamanrasset	z.	20·5	223	e 4 26?	−16	e 8 20	− 7	e 4 51?	PP	e 9·5
Upsala		21·2	355	e 5 1?	+12	i 8 48	+ 7	e 10 12	Q	e 12·0
Pulkovo		21·9	13	i 4 59	+ 2	e 9 7	+13	—	—	—
Baku		22·6	76	—	—	e 9 11	+ 4	—	—	—
Ashkabad		29·5	79	e 6 18	+10	—	—	—	—	—
Sverdlovsk		31·8	42	6 27	− 1	—	—	—	—	—
Scoresby Sund		38·6	340	i 7 29	+ 3	—	—	—	—	—
College		76·3	356	e 11 51	− 1	—	—	—	—	—
Hungry Horse		84·3	332	e 12 32	− 3	—	—	—	—	—
Pierce Ferry		94·5	324	e 13 30	+ 7	—	—	e 17 22	PP	—
China Lake	z.	96·3	327	i 17 9	PP	—	—	—	—	—

Additional readings :—
Athens eP_g =36s.
Messina iSE =1m.38s., iE =2m.1s.
Belgrade eZ =1m.53s., eP_gNW =2m.12s., eZ =2m.24s., iS_gNW =3m.35s., iNW =3m.59s.
Rome iS =2m.48s.
Bucharest eN =1m.57s. and 3m.55s.
Timisoara eE =4m.20s., eN =4m.36s., iE =4m.53s.
Ogyalla eN =4m.20s., eS_gN =5m.8s., eE =5m.46s., eN =6m.0s. and 6m.14s., eE = 6m.21s.
Prague e =3m.21s., 3m.31s., 5m.6s., and 6m.26s.
Helwan eN =4m.48s., eZ =9m.2s.
Cheb e =4m.24s. and 6m.6s.
Stuttgart e =3m.46s., eZ =5m.52s.
Strasbourg e =4m.5s., 5m.8s., and 5m.32s.
Besançon ePPP =3m.38s., e =3m.51s., 4m.3s., 4m.51s., and 5m.34s., eSS =6m.1s., eSSS = 6m.22s., $ePcP$ =8m.52s.
Jena eN =3m.40s. and 6m.36s.
Algiers Univ. iPPZ =3m.25s.
Potsdam iN =6m.54s., iE =9m.6s., iN =9m.9s.
Paris isP? =4m.38s.
Alicante PP =4m.37s., S? =8m.9s.
Almeria PP =4m.22s.
Granada PPP =5m.44s.
Malaga PP =5m.26s., iS? =7m.36s., eSS =9m.38s.
Tamanrasset iZ =4m.29s. and 4m.54s., ePPPZ =5m.1s.?.

Jan. 9d. 8h. 53m. 58s. Epicentre 11°·1N. 126°·2E. (as on 1937, June 20d.).

A = −·5797, B = +·7921, C = +·1913 ; δ = +7 ; h = +6 ;
D = +·807, E = +·591 ; G = −·113, H = +·154, K = −·982.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila	6·2	305	i 1 34	− 1	i 3 26	S_g	—	—	—
Nanking	21·9	342	4 54a	− 3	e 8 53	− 1	9 56	Q	11·2
Djakarta	25·8	229	e 5 37	+ 3	i 10 16	+14	—	—	—
Vladivostok	32·3	8	e 6 31?	− 2	i 11 43	− 3	—	—	—
Chatra	39·9	299	e 7 37	0	—	—	—	—	—

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Irkutsk	44·7	340	e 8 17	+ 1	e 14 53	− 1	—	—	—
Bombay	52·0	285	e 9 2?	−11	e 16 36	0	—	—	—
Almata	53·2	317	i 9 24	+ 2	i 16 54	+ 2	—	—	—
Naryn	53·2	314	i 9 24	+ 2	—	—	—	—	—
Rybach'e	53·6	316	e 9 24	− 1	—	—	—	—	—
Frunse	54·7	316	i 9 33	0	i 17 18	+ 5	—	—	—
Andijan	55·6	312	9 39	− 1	17 29	+ 4	—	—	—
Fergana	56·0	312	e 9 42	− 1	e 17 30?	0	—	—	—
Obi-garm	57·1	310	i 9 49	− 1	i 17 46	+ 1	—	—	—
Stalinabad	57·8	310	i 9 54	− 1	17 54	0	—	—	—
Lunacharskoe	58·0	312	—	—	e 17 59	+ 2	—	—	—
Tashkent	58·0	312	e 9 57	0	e 17 58	+ 1	—	—	—
Tchimkent	58·0	313	i 9 56	− 1	—	—	—	—	—
Mary	63·0	307	i 10 39	+ 8	—	—	—	—	—
Ashkabad	65·8	307	e 10 49	0	e 19 36	+ 1	—	—	—
Sverdlovsk	67·5	328	10 59	− 1	19 53	− 3	—	—	—
Lenkoran	73·3	308	11 36	+ 1	21 6	+ 2	—	—	—
Tiflis	76·3	311	e 11 48	− 4	—	—	—	—	—
Gori	76·8	311	e 11 56	+ 1	—	—	—	—	—
College	78·3	26	e 12 4	+ 1	—	—	e 12 14	PcP	—
Moscow	80·1	325	e 12 14	+ 1	e 22 15	− 3	—	—	—
Ksara	84·2	303	i 12 38	+ 4	23 13	ScS	—	—	—
Helwan	88·7	300	e 12 56	− 1	e 23 44	+ 1	e 13 37	?	—
Pierce Ferry	106·4	48	e 19 18	PP	—	—	—	—	—
San Juan	148·3	23	e 19 54	[+ 9]	—	—	—	—	—

Long waves were also recorded at Wellington, Copenhagen, Kew, Paris, and Huancayo.

Jan. 9d. 16h. 0m. 20s. Epicentre 80°·0N. 125°·0E.

$A = -·1003$, $B = +·1432$, $C = +·9846$; $\delta = 0$; $h = -14$;
$D = +·819$, $E = +·574$; $G = -·565$, $H = +·807$, $K = -·175$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Resolute Bay		24·9	25	5 14	− 3	e 9 34	+ 2	—	—	—
Klyuchi		26·3	132	e 6 4	PP	—	—	e 6 45	PPP	—
College		26·6	72	e 5 46	+ 4	e 10 29	+13	—	—	e 14·5
Scoresby Sund		28·6	339	i 5 54	− 6	—	—	—	—	—
Irkutsk		28·7	207	e 6 4	+ 3	11 1	+11	—	—	—
Sverdlovsk		30·2	261	6 13	− 1	11 14	+ 1	—	—	—
Pulkovo		32·6	292	e 6 30	− 5	e 11 43	− 8	—	—	—
Helsinki		33·1	297	e 6 42	+ 2	e 11 46	−13	—	—	—
Upsala		34·5	303	—	—	e 14 57	SSS	—	—	e 17·1
Moscow		35·3	283	e 6 58	− 1	e 12 29	− 4	—	—	—
Vladivostok		37·1	171	i 7 19	+ 5	e 16 10	SSS	e 8 49	PP	—
Copenhagen		39·3	305	i 7 27 a	− 5	—	—	—	—	18·7
Almata		40·5	237	i 7 45	+ 3	e 14 1	+ 9	—	—	—
Kurmenty		40·7	236	e 7 46	+ 2	—	—	—	—	—
Frunse		41·5	240	i 7 52	+ 2	e 14 14	+ 7	—	—	—
Rybach'e		41·7	238	e 7 55	+ 3	—	—	—	—	—
Tchimkent		42·8	245	i 8 1	0	—	—	—	—	—
Lunacharskoe		43·8	245	e 8 10	+ 1	—	—	—	—	—
Tashkent		43·8	245	i 8 9	0	e 15 5	PPS	9 55	PP	—
Andijan		43·9	242	8 11	+ 1	e 14 46?	+ 4	—	—	—
Jena	N.	44·1	304	e 8 6	− 6	—	—	e 10 12	PP	—
Fergana		44·3	242	i 8 14	+ 1	—	—	e 10 8	PP	—
Prague		44·5	302	e 8 11	− 4	—	—	e 9 56	PP	e 24·2
Skalnate Pleso	N.	44·5	296	e 8 11	− 4	e 14 53	+ 2	e 10 6	PP	—
Kishinev		45·2	288	8 16	− 4	—	—	—	—	—
Grozny		45·8	270	8 26	+ 1	—	—	—	—	—
Samarkand		45·8	247	e 8 25	0	—	—	—	—	—
Obi-garm		46·3	244	i 8 29	0	e 15 20	+ 4	—	—	—
Stuttgart	Z.	46·5	305	e 8 26k	− 5	—	—	e 10 13	PP	—
Stalinabad		46·6	245	i 8 30	− 2	i 15 23	+ 2	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yalta		46·7	281	8 29	− 3	e 15 17	− 5	—	—	—
Strasbourg		46·9	307	i 8 30	− 4	—	—	e 10 56	PPP	e 24·7
Seattle		47·2	58	e 8 46	+10	—	—	i 9 48	PcP	—
Zugdidi		47·3	273	e 8 36	− 1	—	—	—	—	—
Gori		47·4	271	e 8 36	− 2	—	—	—	—	—
Paris		47·4	312	e 8 42	+ 4	—	—	e 7 58	?	—
Tiflis		47·5	270	e 8 36	− 2	—	—	—	—	—
Hungry Horse		47·7	51	i 8 40	0	—	—	—	—	—
Bucharest	N.	48·1	289	e 9 16	?	—	—	—	—	—
Kizyl-Arvat		48·2	258	e 8 46	+ 4	—	—	—	—	—
Besançon		48·5	308	e 8 40	− 6	—	—	—	—	—
Mary		48·6	251	i 8 47	0	—	—	—	—	—
Belgrade		48·7	294	e 8 52a	+ 4	e 15 50	0	e 19 44	SS	e 36·4
Ashkabad		48·9	255	8 50	0	—	—	—	—	—
Triest		48·9	301	i 8 45	− 5	e 15 48?	− 5	e 10 39	PP	—
Istanbul	Z.	50·9	286	e 9 2	− 3	—	—	e 10 58	PP	—
Florence		51·1	303	e 9 15	+ 9	—	—	—	—	—
Rome		52·8	301	e 9 14	− 5	e 16 25	−22	e 11 3	PP	—
Ottawa	Z.	54·3	18	e 9 27	− 3	—	—	—	—	—
Logan		54·4	51	e 9 36	+ 5	—	—	—	—	—
Mineral	Z.	54·4	60	i 9 26k	− 5	—	—	i 9 35	P	—
Reno	Z.	55·5	58	e 9 40k	+ 1	—	—	—	—	—
Chatra	N.	55·6	222	e 9 43	+ 3	—	—	—	—	—
Ksara		56·8	277	i 9 46a	− 2	19 35	− 6	—	—	—
Toledo		57·0	315	e 9 46	− 4	—	—	e 10 30	PcP	—
Lick	Z.	57·4	61	e 9 54k	+ 1	—	—	—	—	—
Weston		57·5	15	e 9 52	− 1	—	—	—	—	—
Cleveland	Z.	57·8	24	i 10 0a	+ 5	—	—	—	—	—
Fresno	Z.	58·2	59	e 10 0a	+ 2	—	—	—	—	—
Tinemaha	Z.	58·2	57	e 9 59	+ 1	—	—	e 10 8	pP	—
Algiers Univ.	Z.	59·2	308	e 9 59	− 6	—	—	—	—	—
China Lake	Z.	59·5	57	i 10 8	+ 1	—	—	i 10 16	pP	—
Granada		59·6	315	i 10 15k	+ 7	18 12	− 5	12 24	PP	—
Boulder City		59·7	55	e 10 10	+ 1	—	—	—	—	—
Pierce Ferry		59·7	54	i 10 8	− 1	—	—	e 12 29	PP	—
Almeria		59·8	313	10 10	+ 1	18 28	+ 8	12 23	PP	35·0
Pasadena	Z.	60·7	58	e 10 17	+ 2	—	—	i 10 26	pP	—
Washington	Z.	60·7	20	i 10 13	− 2	—	—	e 11 5	PcP	—
Helwan		61·4	280	e 10 18	− 2	e 18 40	0	e 13 56	PPP	—
Palomar	Z.	62·0	57	e 10 28	+ 4	—	—	—	—	—
Tucson		63·9	52	e 10 36	− 1	—	—	e 13 4	PP	—
Bombay		65·3	236	e 10 40?	− 6	e 19 40?	+11	—	—	—
Tamanrasset	Z.	72·6	303	i 11 24a	− 7	—	—	i 11 43	PcP	—
Tacubaya		78·1	43	i 12 14	PcP	—	—	—	—	—
San Juan		81·6	11	e 12 20	− 1	—	—	—	—	—
La Paz	Z.	116·2	14	i 19 45	PP	—	—	—	—	—

Additional readings :—
Jena eE = 8m.44s.
Prague e = 8m.36s., 10m.6s., and 15m.4s.
Skalnate Pleso eN = 15m.11s., eSSN = 17m.58s.
Stuttgart eZ = 8m.36s. and 8m.39s.
Strasbourg e = 8m.50s.
Seattle e = 8m.53s., i = 9m.16s. and 9m.30s., ePP = 10m.53s., iPPP = 11m.32s.
Hungry Horse i = 8m.49s.
Bucharest eN = 10m.55s., eE = 14m.11s.
Belgrade ePcPZ = 10m.41s.
Triest eSPZ = 16m.0s.
Lick eZ = 10m.2s. and 10m.14s.
Fresno eZ = 10m.8s., eE = 10m.32s.
Pierce Ferry ePKP,PKP = 39m.44s.
Washington iZ = 15m.42s., eZ = 17m.27s.
Palomar iZ = 10m.33s. and 10m.38s.
Tucson e = 10m.45s.
Tamanrasset iZ = 11m.34s., ePPZ = 13m.58s., ePKP,PKPZ = 39m.9s.
Long waves were also recorded at Alicante, De Bilt, Pavia, and Kodaikanal.

Jan. 9d. 17h. 18m. 7s. Epicentre 35°·5N. 140°·4E. Focus at Base of Superficial Layers. (as on 1950, Sept. 10d.).

Intensity V at Tsuda (Kanagawa pref.); II-III at Tokyo, Osima, Kohu, Tito, Senzu (Tokyo City), and Sengokubara (Kanagawa pref.). Macroseismic radius between 100 and 200km. Epicentre 35°·4N. 140°·2E. Depth 40km.

The Seismological Bulletin of the C.M.O., Japan, for Jan., 1951, Tokyo, 1951, pp.11-12 with macroseismic chart.

$A = -·6287$, $B = +·5201$, $C = +·5781$; $\delta = -3$; $h = 0$;
$D = +·637$, $E = +·771$; $G = -·445$, $H = +·368$, $K = -·816$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Tokyo	0·6	289	0 10	− 2	0 19	− 2
Mera	0·7	219	0 11	− 2	0 20	− 3
Yokohama	0·7	264	0 14	+ 1	0 21	− 2
Tukubasan	0·8	341	0 15	0	0 28	+ 2
Mito	0·9	3	0 20	+ 4	0 32	+ 4
Kumagaya	1·0	309	0 18	0	0 31	0
Osima	1·1	229	0 14	− 5	0 28	− 5
Misima	1·2	252	0 25	+ 5	0 40	+ 4
Titibu	1·2	294	0 33	S	(0 33)	− 3
Hunatu	1·3	270	0 19a	− 3	0 33	− 5
Maebasi	1·3	313	0 23	+ 1	0 40	+ 2
Kohu	1·5	275	0 23	− 1	0 39	− 5
Onahama	1·5	16	0 42	+18	1 1	+17
Shirakawa	1·6	355	0 37	+11	0 51	+ 5
Oiwake	1·7	299	0 24	− 4	—	—
Shizuoka	1·7	252	0 24	− 4	0 43	− 6
Iida	2·1	270	0 36	+ 3	1 13	+14
Inawasiro	2·1	359	0 40	+ 7	1 5	+ 6
Matumoto	2·1	290	0 48	+15	—	—
Nagoya	2·8	263	0 44	+ 1	1 23	+ 7
Sendai	2·8	8	1 5	+22	1 42	+26
Tsuruga	3·5	274	1 31	S	(1 31)	− 3

Jan. 9d. Readings also at 0h. (Hungry Horse, Scoresby Sund, and near Klyuchi (2)), 1h. (Wellington, Cobb River, China Lake, Pierce Ferry, and Tucson), 2h. (Kew), 3h. (Tamanrasset, Hungry Horse, Apia, near Mizusawa, and near Athens), 4h. (Mineral, Reno, and Tucson), 6h. (La Plata, Almata, near Kurmenty, and Chilisk), 7h. (Almata, near Kurmenty, and Chilisk), 8h. (College and near Khorog), 10h. (China Lake, Pierce Ferry, and Tucson), 12h. (near Obi-garm), 13h. (Chatra, La Paz, China Lake, Scoresby Sund, and Ashkabad), 14h. (Ashkabad), 15h. (Tamanrasset), 16h. (College, Tamanrasset, Sofia, Messina, near Taranto, and near Athens), 17h. (Alicante), 18h. (College and Manila), 19h. (La Paz and near Huancayo), 20h. (College, Hungry Horse, Pasadena, China Lake, Tinemaha, Boulder City, Pierce Ferry, Tucson, Stuttgart, near Apia, Samarkand, Andijan, near Khorog, Kulyab, Stalinabad, Dzhergetal, and Fergana), 21h. (Grahamstown and Stuttgart), 22h. (China Lake, College, Pierce Ferry, Vera Cruz, near Tacubaya (2), Puebla, and near Granada (2)), 23h. (Pierce Ferry).

Jan. 10d. 2h. 15m. 30s. Epicentre 35°·5N. 140°·4E. Depth of focus 0·005. (as on 9d.).

Intensity II-III at Tokyo, Osima, Hunatu, and Kohu. Suggested depth 45km. Epicentre near that adopted.

Seismo. Bull. Cent. Met. Obs., Japan, for Jan., 1951, Tokyo, 1951, p.12.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Tokyo	0·6	289	0 13k	− 1	0 20	− 5
Mera	0·7	219	0 17	+ 2	0 26	− 1
Yokohama	0·7	264	0 17k	+ 2	0 25	− 2
Tukubasan	0·8	341	0 16	− 1	0 26	− 3
Mito	0·9	3	0 18	0	0 32	+ 1

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.			L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Kumagaya		1·0	309	0 22	+ 3	0 34	+ 1			
Osima		1·1	229	0 20	0	0 31	− 5			
Utunomiya		1·1	338	0 20	0	0 34	− 2			
Misima		1·2	252	0 19	− 3	0 33	− 5			
Hunatu		1·3	270	0 21	− 2	0 34	− 6			
Maebasi		1·3	313	0 26	+ 3	0 38	− 2			
Kohu		1·5	275	0 26	0	0 38	− 7			
Onahama		1·5	16	0 48	S	1 0	?			
Oiwake		1·6	299	0 27	0	0 43	− 4			
Shizuoka		1·7	252	0 27	− 1	0 46	− 4			
Omaesaki		2·0	243	0 24	− 8	—	—			
Matumoto		2·1	290	0 56	S	(0 56)	− 3			
Hukusima		2·3	1	0 40	+ 3	1 7	+ 3			
Nagoya		2·8	263	0 45	+ 1	1 17	0			
Sendai		2·8	8	1 8	S	(1 8)	− 9			
Gihu		3·0	268	1 6	?	—	—			

Jan. 10d. 6h. 30m. 28s. Epicentre 14°·5S. 66°·5E.

A = +·3862, B = +·8883, C = −·2488 ; δ = +13 ; h = +6 ;
D = +·917, E = −·399 ; G = −·099, H = −·228, K = −·969.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tananarive		18·7	255	e 4 22	0	e 8 19	SS	—	—	e 9·6
Kodaikanal	E.	26·9	22	e 5 23	−22	—	—	—	—	—
Bombay		33·8	10	e 6 51	+ 5	e 12 18	+ 8	—	—	—
Mary		52·0	356	e 9 13	0	—	—	—	—	—
Kulyab		52·2	4	e 9 15	0	e 16 39	0	—	—	—
Stalinabad		52·8	3	e 9 20	+ 1	e 16 48	+ 1	—	—	—
Obi-garm		53·0	4	e 9 21	0	—	—	—	—	—
Fergana		54·8	6	e 9 34	0	—	—	—	—	—
Andijan		55·2	6	9 36	− 1	—	—	—	—	—
Helwan	Z.	55·6	323	e 9 42	+ 2	—	—	e 9 57	pP	—
Tashkent		55·6	3	i 9 40	0	e 17 27	+ 2	—	—	—
Tchimkent		56·6	3	i 9 46	− 1	—	—	—	—	—
Almata		58·3	10	9 59	0	—	—	—	—	—
Tamanrasset	Z.	70·3	302	i 11 15a	− 2	—	—	—	—	—
Sverdlovsk		71·2	357	e 11 22	− 1	e 20 40	0	—	—	—
Stuttgart	Z.	80·8	326	e 12 18	+ 1	—	—	—	—	—
College		124·5	17	e 19 6	[+ 5]	—	—	—	—	—
Hungry Horse		146·2	0	i 19 46	[+ 5]	—	—	—	—	—
China Lake	Z.	158·5	8	e 20 10	[+11]	—	—	i 20 38	PKP_2	—
Pierce Ferry		158·5	1	e 20 7	[+ 8]	—	—	—	—	—
Tucson		162·2	352	e 20 10	[+ 7]	—	—	—	—	—

Jan. 10d. 8h. 27m. 1s. Epicentre 22°·3S. 176°·8W. Depth of focus 0·010.
(as on 1948, January 22d.).

A = −·9246, B = −·0517, C = −·3773 ; δ = −9 ; h = +5 ;
D = −·056, E = +·998 ; G = +·377, H = +·021, K = −·926.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		9·7	30	e 2 18?	0	e 4 3?	− 3	—	—	—
Brisbane		27·8	253	i 5 43a	+ 1	—	—	i 6 40	PP	—
Riverview		30·4	240	e 6 9	+ 4	e 11 28	sS	e 7 10	PP	e 13·5
Lick	Z.	78·8	42	e 11 55a	+ 1	—	—	e 12 9	pP	—
Pasadena	Z.	79·2	46	e 11 55	− 1	—	—	—	—	—
Palomar	Z.	79·5	47	i 11 58	0	—	—	—	—	—
Riverside	Z.	79·5	46	e 11 55	− 3	—	—	—	—	—
Fresno	Z.	79·6	43	e 11 59k	+ 1	—	—	—	—	—
Vladivostok		80·4	324	i 12 7	+ 5	e 21 4	−55	—	—	—
China Lake	Z.	80·5	45	i 12 2	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha	z.	80·8	44	i 12 5	+ 1	—	—	—	—	—
Mineral	z.	80·8	40	i 12 5k	+ 1	—	—	i 12 18	pP	—
Boulder City		82·4	46	e 12 13	0	—	—	—	—	—
Pierce Ferry		83·0	47	e 12 15	− 1	—	—	—	—	—
Tucson		83·1	51	e 12 16	0	—	—	—	—	—
College		89·7	11	e 12 50	+ 2	i 23 42	+12	i 13 4	pP	e 40·2
Hungry Horse		89·9	36	e 12 49	0	—	—	—	—	—
La Plata	E.	98·8	133	—	—	23 47	[−12]	25 59	PS	46·0
La Paz		100·2	112	17 31	PP	23 49	[−16]	i 24 7	SKKS	48·9
Weston		115·9	52	e 18 1	[−31]	—	—	—	—	e 60·8
Ksara		149·1	299	e 19 34?	[+ 1]	—	—	e 23 16?	PP	—
Stuttgart	z.	152·7	352	e 19 41	[+ 3]	—	—	e 20 4	pPKP	—
Helwan	z.	153·7	293	e 20 6	[+27]	—	—	e 23 41	PP	—
Tamanrasset	z.	177·8	—	i 19 59a	[0]	e 25 39	PP	e 20 27	pPKP	—

Additional readings :—
Apia eSEN = 5m.8s.
Riverview ePP?Z = 7m.7s., eSS?N = 12m.55s.
La Paz SS = 31m.45s., i = 31m.59s.
Stuttgart eZ = 19m.50s.
Helwan eZ = 25m.17s.
Tamanrasset ePKP$_2$Z = 21m.48s., ePPP?Z = 28m.47s.
Long waves were also recorded at Auckland, Christchurch, Kaimata, Wellington, Berkeley, Palisades, Seven Falls, Harvard, Kew, De Bilt, and Paris.

Jan. 10d. 14h. Japanese shock attributed to epicentre 42°·1N. 144°·0E. Depth 80km. by Central Meteorological Observatory. The readings listed below are not consistent with this determination.

Urakawa P = 7m.2s., S = 7m.16s.
Kusiro P = 7m.5s., S = 7m.15s.
Nemuro P = 7m.15s., S = 7m.35s.
Hatinohe P = 7m.16s., S = 7m.43s.
Sapporo P = 7m.19s., S = 7m.43s.
Abashiri P = 7m.20s., S = 7m.39s.
Aomori P = 7m.37s., S = 8m.10s.
Morioka P = 7m.39s., S = 8m.13s.
Mizusawa PE = 8m.3s., SE = 8m.29s.
Sendai P = 8m.15s., S = 8m.48s.
Hukusima P = 8m.18s., S = 9m.4s.
Akita P = 8m.23s.
Inawasiro P = 8m.26s., S = 9m.27s.
Kumagaya P = 9m.20s.
Utunomiya P = 9m.28s.
Tukubasan P = 9m.36s.
Tokyo P = 9m.51s.
Osima P = 10m.14s.
College iP = 14m.48s., ipP = 15m.5s.
Hungry Horse iP = 17m.33s.
China Lake iPZ = 18m.9s., iZ = 18m.26s.
Overton ePZ = 18m.19s., iZ = 18m.36s.
Pierce Ferry eP? = 18m.22s., e = 18m.39s.

Jan. 10d. 19h. 3m. 38s. Epicentre 52°·0N. 176°·2E. Depth of focus 0·010.
(as on 1947, December 16d.).

$A = -·6168$, $B = +·0410$, $C = +·7860$; $\delta = -8$; $h = -6$;
$D = +·066$, $E = +·998$; $G = -·784$, $H = +·052$, $K = -·618$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		22·4	41	e 4 55	+ 4	i 9 4	+18	i 5 6	pP	e 9·3
Vladivostok		30·8	271	e 6 0	− 9	i 10 59	− 5	—	—	—
Resolute Bay	z.	40·5	25	7 31	0	—	—	—	—	—
Kabansk		41·3	300	7 29	− 8	13 44	0	—	—	—
Irkutsk		42·4	301	e 7 40?	− 6	e 14 1?	+ 1	—	—	—
Shasta Dam		42·7	80	i 7 49	0	—	—	—	—	—
Hungry Horse		43·3	65	i 7 53	− 1	—	—	e 9 39	PP	—
Mineral	z.	43·4	80	e 7 54a	0	—	—	i 8 29	sP	—
Berkeley	z.	44·5	84	i 8 4	+ 1	—	—	—	—	—
Lick	z.	45·2	84	e 8 9a	0	—	—	—	—	—

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.	46·7	83	e 8 22a	+ 1	—	—	—	—	—
Tinemaha	z.	47·4	82	i 8 27	+ 1	—	—	i 8 42	pP	—
China Lake	z.	48·7	82	i 8 36	0	—	—	i 8 50	pP	—
Pasadena	z.	49·4	84	i 8 41	− 1	—	—	—	—	—
Riverside	z.	50·0	84	i 8 45	− 1	—	—	i 9 5	sP	—
Boulder City		50·2	80	e 8 49	+ 1	—	—	—	—	—
Pierce Ferry		50·6	79	e 8 51	0	—	—	—	—	—
Palomar	z.	50·7	84	i 8 51	− 1	—	—	i 9 13	sP	—
Tucson		55·2	81	i 9 25	0	—	—	e 10 52	PcP	—
Sverdlovsk		59·4	325	9 52	− 2	18 3	+ 9	—	—	—
Cleveland	z.	65·2	55	i 10 33a	0	—	—	i 10 44	pP	—
Andijan		66·5	307	e 10 36	− 5	—	—	—	—	—
Tchimkent		66·7	310	e 10 39	− 4	—	—	—	—	—
Fergana		67·1	307	e 10 41	− 4	—	—	—	—	—
Moscow		67·3	337	e 10 47	+ 1	—	—	—	—	—
Tashkent		67·6	309	i 10 46?	− 2	e 19 37?	+ 1	—	—	—
Harvard		69·1	47	e 10 56	− 2	—	—	—	—	e 42·6
Palisades		69·2	50	i 10 57	− 1	—	—	—	—	e 35·2
Weston		69·3	47	i 10 58	− 1	—	—	—	—	e 34·2
Stalinabad		70·0	308	e 11 0	− 3	20 11	+ 7	—	—	—
Grozny		75·8	326	e 11 37	0	—	—	—	—	—
Tiflis		77·6	326	e 11 44	− 3	—	—	—	—	—
Zugdidi		77·9	328	e 12 1	pP	—	—	—	—	—
Stuttgart	z.	79·0	353	e 11 53	− 2	—	—	—	—	—
Paris		79·4	356	i 11 58	+ 1	—	—	—	—	—
Bombay		83·2	292	e 12 17	0	e 16 34	PP	—	—	—
Rome	N.	85·4	349	e 17 59	PPP	e 22 49	0	e 28 45	SS	—
Granada		91·2	1	(12 56a)	+ 1	—	—	—	—	45·0
Algiers Univ.	z.	91·4	355	i 12 56	0	—	—	—	—	—
Almeria		91·5	0	9 58	?	—	—	—	—	48·6
San Juan		91·5	58	i 12 57	0	—	—	—	—	—

Additional readings :—
Granada iP =9m.53s.a ; true P is given as PP.
Long waves were also recorded at Ottawa, Seven Falls, and Kodaikanal.

Jan. 10d. 19h. 15m. 17s. I } Epicentre 42°·5S. 172°·9E. (as on 1950, Feb. 6d.).
19h. 23m. 13s. II }

Shock I intensity VII at Cheviot ; IV at Greymouth. Epicentre 42°·8S. 173°·2E. Numerous aftershocks.

R. C. Hayes.
Earthquake origin in New Zealand, 1951. N.Z. Journal of Science and Technology, Sect. B., Vol. 34, No. 4, Jan., 1953, p.252 Chart of Intensities p.257.

$A = -·7338$, $B = +·0914$, $C = -·6731$; $\delta = -12$; $h = -3$;
$D = +·124$, $E = +·992$; $G = +·668$, $H = -·083$, $K = -·740$.

			Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
			°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Christchurch		1·0	191	i 0 17	− 4	—	—	i 0 21	P_g	—
II			1·0	191	i 0 17	− 4	i 0 27	− 9	—	—	—
I	Kaimata	N.E.	1·1	269	i 0 25	+ 3	i 0 43	+ 4	—	—	—
II		N.E.	1·1	269	i 0 25	+ 3	i 0 41	+ 2	—	—	—
I	Cobb River	E.	1·4	355	e 0 29	+ 2	—	—	—	—	—
II		E.	1·4	355	i 0 29	+ 2	i 0 55	+ 9	—	—	—
I	Wellington		1·8	49	e 0 31	− 1	i 0 59	+ 3	—	—	—
II			1·8	49	i 0 31	− 1	0 56	0	—	—	—
I	New Plymouth	E.	3·5	15	e 1 1	+ 4	1 46	+ 6	—	—	—
II		E.	3·5	15	e 1 3	P*	2 5	S_g	—	—	—
I	Tuai	N.	4·9	43	1 27	P*	i 2 13	− 2	—	—	—
II		N.	4·9	43	e 1 37	P_g	e 2 19	+ 4	—	—	—
I	Auckland	N.	5·8	15	1 29	0	2 53	S*	i 2 3	P_g	—
I	Riverview		19·1	290	i 4 28a	+ 1	i 8 11	+14	i 4 50	PP	e 9·3
I	Brisbane		22·1	307	i 5 0	+ 1	i 9 11	+13	—	—	—
I	Perth		45·9	264	—	—	i 15 15	+ 4	—	—	—
II			45·9	264	i 9 45	PcP	i 10 57	PPP	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I La Plata		90·0	140	17 55	PKP	23 13	[−20]	30 19	SS	47·1
I Grahamstown	z.	98·5	209	—	—	i 34 59	SSS	—	—	—
I La Paz		98·8	122	13 45	+ 2	i 24 23	[+ 2]	17 51	PP	46·5
I China Lake		100·5	51	e 13 46	− 5	—	—	—	—	—
I Pierce Ferry		102·8	53	e 13 58	− 3	e 26 33	PS	—	—	—
II Bogota		110·0	102	e 19 2	PP	—	—	—	—	e 45·8
I Hungry Horse		111·0	43	e 18 30	PP	—	—	—	—	—
I College		111·4	16	e 18 35	PP	—	—	—	—	—
I Cleveland		126·4	64	i 19 4k	[− 1]	—	—	i 19 14	pPKP	—
I Resolute Bay	z.	131·0	21	19 9	[− 5]	—	—	—	—	—
I Ksara		145·4	270	i 19 38	[− 2]	38 52	?	—	—	—
I Helwan	z.	146·8	260	e 19 43	[+ 1]	—	—	—	—	—
I Scoresby Sund		150·9	10	e 19 53	[+ 4]	—	—	—	—	—
I Tamanrasset	z.	157·7	213	e 19 58	[0]	e 24 13	PP	e 20 35	PKP_2	52·7
I Jena	E.	164·7	307	e 20 4?	[− 1]	—	—	—	—	—
I Stuttgart		167·0	304	e 20 5	[− 2]	e 25 0	PP	e 21 12	PKP_2	—
I Pavia		167·9	289	e 36 53	PPS	—	—	—	—	e 83·7
I Strasbourg		167·9	305	e 21 17	PKP_2	—	—	e 25 5	PP	—
I Algiers Univ.	z.	170·3	—	i 20 9	[0]	—	—	e 21 27	PKP_2	—
I Paris		170·8	—	i 21 28	PKP_2	e 33 14	PS	i 25 11	PP	e 89·7

Additional readings :—
Riverview I iPPPZ = 4m.59s., iZ = 5m.7s., iSN = 8m.14s., iZ = 8m.22s., iE = 8m.26s., iP_cPZ = 8m.39s., iSSN = 8m.43s., iZ = 8m.53s., iSSSE = 8m.58s.
Brisbane I iPZ = 5m.3s., iN = 9m.23s.
La Plata I N = 23m.19s. and 35m.55s.
La Paz I iPS = 26m.43s.
Hungry Horse I i = 19m.12s.
Helwan I eZ = 20m.59s. and 22m.22s.
Tamanrasset I eZ = 20m.53s. and 33m.40s., QZ = 47m.43s.
Jena I eE = 21m.2s.
Stuttgart I e = 36m.43s.
Pavia I e = 39m.23s. and 47m.17s.
Strasbourg I e = 36m.19s.
Paris I ePPS = 38m.32s., e = 41m.32s. and 48m.11s.
Long waves were also recorded at Manila, Kew, Alicante, Rome, De Bilt, Pasadena, Tucson, Seven Falls, and Harvard.

Jan. 10d. Readings also at 0h. (College), 1h. (Ili, Naryn, near Chilisk, Almata, Frunse, Krasnogorka, and Kurmenty), 2h. (Vera Cruz, near Puebla, and Tacubaya), 4h. (near Kurmenty), 6h. (Rome), 7h. (La Paz and Collmberg), 8h. (Ravensburg and Stuttgart), 9h. (Tucson (2), Pierce Ferry, and College), 10h. (Apia (2), Riverview, Auckland, Christchurch, Wellington, Brisbane, Vladivostok, Palomar, Pasadena, Riverside, China Lake, Tucson, Boulder City, Overton, Pierce Ferry, Lick, Mineral, Seattle, Hungry Horse, College, La Paz, Collmberg, Strasbourg, Stuttgart, Rome, Helwan, Ksara, and Tamanrasset), 11h. (Hungry Horse, College, Seven Falls, Palisades, Weston, Pavia, Granada, and Tamanrasset), 12h. (Pierce Ferry, Tucson, College, and near Balboa Heights), 13h. (near Chatra (2)), 16h. (near Athens), 17h. (Chatra), 18h. (Grahamstown, Pierce Ferry, Almata, Krasnogorka, Rybach'e, Samarkand, Stalinabad, near Andijan, Dzhergetal, Fergana, Frunse, Ili, Kurmenty, Lunacharskoe, Naryn, Tashkent, and Tchimkent), 19h. (Hungry Horse, Grahamstown Kulyab, Stalinabad, and near Dzhergetal), 21h. (Rathfarnham Castle, College, Chilisk, Ili, Kulyab, Samarkand, Tiflis, near Almata, Andijan, Dzhergetal, Fergana, Frunse, Khorog, Krasnogorka, Kurmenty, Lunacharsoke, Naryn, Rybach'e, Stalinabad, Tashkent, and Tchimkent), 22h. (China Lake, Tucson, Pierce Ferry, Hungry Horse, La Paz, Bogota, and near Huancayo), 23h. (near Apia),

Jan. 11d. Readings at 0h. (Stuttgart (2), near Zürich, College, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Tucson, Pierce Ferry, and Hungry Horse), 1h. (Huancayo, Durham, near Rathfarnham Castle), 2h. (near Tacubaya, Puebla, and near Messina), 3h. (near Athens), 4h. (College, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Hungry Horse, Lick, Mineral, Shasta Dam, Vladivostok, and Mizusawa), 5h. (Chilisk, Kurmenty, and Krasnogorka), 6h. (College and Hungry Horse), 7h. (Florence), 8h. (College, near Rome, Florence, near Dzhergetal, Obi-garm, Kulyab, and Khorog), 9h. (College, Klyuchi, Obi-garm, Kulyab, Khorog, near Andijan, Fergana, Dzhergetal, and near Apia), 10h. (College, Tucson, San Juan, Stalinabad, near Obi-garm (2), Kulyab, Khorog, Fergana, and Dzhergetal), 11h. (near Klyuchi), 12h. (College, Hungry Horse, and near Chatra), 13h. (Pietermaritzburg and Grahamstown), 17h. (Samarkand, Andijan, Kulyab, near Obi-garm, Khorog and Fergana), 19h. (near Bogota and near Klyuchi), 20h. (College, Tucson, Pasadena, Riverside, Tinemaha, Shasta Dam, Boulder City, Pierce Ferry, Tacubaya, Tamanrasset, and near Apia), 21h. (Pretoria, Tacubaya, La Plata, and Klyuchi).

Jan. 12d. 14h. 55m. 51s. Epicentre 44°·8N. 14°·8E. (as on 1949, Jan. 20d.).

Intensity V at Jablanac (44°42′N. 14°54′E.), Starigrad, Prizna ; IV at Senj, Sv. Juraj, Rab, Prozor ; III at Saborsko and Triest. Epicentre 44°·8N. 14°·7E. (Rome).

M. D. Uzelac.
Annuaire Macroséismique pour l'Anne, 1951, de l'Institut Seismologique de Beograd. Nouvelle Série, No. 11, Belgrade, 1953, p.53.

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Triest		1·1	319	i 0 24	+ 2	i 0 38	− 1	—	—	—
Bologna		2·5	273	e 0 48	+ 5	e 1 18	+ 4	e 0 51	P_g	—
Florence		2·7	248	e 0 59	P_g	e 1 16	− 3	e 1 25	S*	—
Prato		2·8	293	e 0 51	+ 4	e 1 15	− 7	—	—	—
Salo		3·1	286	i 0 59a	P_g	i 1 30	+ 1	i 1 45	S_g	—
Kalossa	N.	3·4	58	e 1 15	P_g	e 1 47	S*	—	—	—
Rocca-di-papa		3·4	207	e 1 14	P_g	e 1 31	− 6	—	—	—
Rome		3·4	210	e 1 6	P_g	i 1 45	S*	i 1 57	S_g	i 2·0
Vienna	N.	3·6	17	i 0 57	− 1	e 1 57	S_g	—	—	—
Ogyalla		3·9	36	e 1 21	P_g	e 1 49	− 1	e 2 9	S_g	—
Budapest		4·0	46	e 1 17	P_g	e 1 42	−10	2 9	S_g	i 2·5
Belgrade	Z.	4·0	87	e 1 11k	P*	e 2 4	S*	i 1 22	P_g	—
Pavia		4·0	277	—	—	e 1 51	− 1	—	—	—
Chur		4·2	301	e 1 7	0	—	—	i 1 11	P	—
Timisoara		4·6	76	e 1 33	P_g	e 2 25	S*	—	—	—
Taranto		4·7	156	e 1 2	−12	—	—	1 35	P_g	—
Ravensburg		4·7	312	e 1 26	P*	e 2 37	S_g	e 1 31	P_g	—
Zürich		5·1	303	e 1 19	− 1	e 2 40	S*	e 1 36	P_g	—
Prague		5·3	358	e 1 16?	− 6	e 2 36	S*	2 53	S_g	—
Ebingen		5·3	312	—	—	e 2 55	S_g	e 2 58	S_g	—
Stuttgart	Z.	5·5	318	e 1 22	− 3	e 2 31	+ 1	i 1 47	P_g	—
Basle		5·7	302	e 1 37	P*	e 3 10	S_g	—	—	—
Neuchatel		5·9	295	e 1 30	− 1	—	—	—	—	e 3·3
Karlsruhe		6·1	316	e 2 2	P_g	e 3 5	S*	e 3 20	S_g	—
Strasbourg		6·1	311	e 1 51	P*	i 2 43	− 2	e 3 4	S*	—
Sofia		6·5	106	e 2 1	P*	—	—	—	—	—
Jena		6·5	342	e 1 37	− 2	e 2 59	+ 4	i 3 36	S_g	—
Besançon		6·6	295	e 1 42	+ 1	e 2 59	+ 1	e 1 57	P*	—
Collmberg	Z.	6·6	350	e 2 33	?	e 3 31	S_g	—	—	—
Potsdam		7·7	352	—	—	e 3 51	S*	—	—	e 5·0

Additional readings :—
Triest $eP_gZ = 27s.$, $iS_g = 45s.$, $iP_gP_gP_g? = 50s.$, $iS_gS_g = 55s.$
Bologna $e = 1m.28s.$
Florence $S_g = 1m.40s.$
Salo $iP_gN = 1m.10s.$
Kalossa $eE = 1m.27s.$, $iN = 2m.16s.$, $iE = 2m.20s.$, and $2m.58s.$
Rome $eZ = 1m.22s.$
Ogyalla $e = 1m.29s.$ and $1m.40s.$, $iS_g = 2m.12s.$
Budapest $iN = 2m.19s.$
Belgrade $iZ = 1m.15s.$, $eP_gZ = 1m.27s.$, $iZ = 1m.48s.$, $iP_gS_gZ = 2m.15s.$, $iS_gZ = 2m.23s.$
Pavia $e = 1m.54s.$ and $2m.24s.$, $i = 2m.35s.$
Ravensburg $eZ = 2m.44s.$
Prague $eP^* = 1m.27s.$, $iP_g = 1m.39s.$, $e = 1m.58s.$, $iS = 2m.14s.$, $e = 2m.31s.$ and $2m.48s.$
Stuttgart $eZ = 1m.26s.$ and $1m.29s.$, $eP^*Z = 1m.35s.$, $eZ = 1m.39s.$, $1m.43s.$, $1m.55s.$, $2m.1s.$, $2m.7s.$, and $2m.12s.$, $eSZ = 2m.22s.$, $eZ = 2m.39s.$, $iS_g = 3m.4s.$, $iZ = 3m.9s.$, $eZ = 3m.15s.$ and $3m.40s.$
Strasbourg $eP_g = 1m.57s.$, $i = 2m.13s.$ and $2m.24s.$, $eS = 2m.38s.$, $e = 2m.55s.$ and $3m.12s.$, $eS = 3m.17s.$, $S_g? = 3m.20s.$, $iS_g = 3m.26s.$
Jena $eEN = 1m.44s.$, $eP_g?N = 2m.4s.$, $eN = 2m.23s.$ and $2m.38s.$, $eS?E = 2m.49s.$, $eS^*?N = 3m.13s.$, $eS_gE = 3m.27s.$, $iS_gE = 3m.31s.$
Besançon $eP_g = 2m.8s.$, $eS^*? = 2m.18s.$, $e = 2m.42s.$, $iS_g = 3m.48s.$

Jan. 12d. Readings also at 0h. (Tacubaya (2) and Merida), 1h. (College), 2h. (Tacubaya and Merida), 4h. (near Chatra), 6h. (La Paz, Huancayo, Tucson, China Lake, Hungry Horse, Pierce Ferry, and Overton), 7h. (near Khorog, Obi-garm, Dzhergetal, College, Overton, and near Chatra), 7h. (Stalinabad, near Khorog, Kulyab, Obi-garm, and Dzhergetal), 9h. (near Grozny (2), College, Overton, Pierce Ferry, and near Tucson), 10h. (College, Riverview, Brisbane, New Plymouth, near Kaimata, Auckland, Christchurch, Cobb River, and Wellington), 11h. (near Taranto, Apia, New Plymouth, near Tuai, Wellington, Cobb River, and Christchurch), 14h. (Chatra, Mary, near Ashkabad, and near Bogota), 15h. (near Kizyl-Arvat), 16h. (near Tananarive), 17h. (near Balboa Heights), 18h. (Tacubaya), 20h. (Tucson), 21h. (Manila), 22h. (Hungry Horse, Obi-garm, and near Kulyab).

Jan. 13d. 20h. 31m. 30s. Epicentre 40°·4N. 125°·1W. (as on 1948, Feb. 19d.).

Berkeley gives Epicentre 40°·4N. 125°·0W.

$A = -\cdot4391$, $B = -\cdot6248$, $C = +\cdot6456$; $\delta = -2$; $h = -2$;
$D = -\cdot818$, $E = +\cdot575$; $G = -\cdot317$, $H = -\cdot528$, $K = -\cdot764$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ferndale		0·6	75	i 0 15	0	e 0 25	− 1	—	—	—
Arcata		0·9	58	e 0 18a	− 2	e 0 28	− 6	e 0 25	?	—
Ukiah		1·9	131	e 0 34	0	i 0 55	− 4	—	—	i 1·2
Mineral		2·7	91	i 0 44a	− 1	i 1 16	− 3	i 0 51	P*	—
Berkeley		3·4	138	i 0 54a	− 1	e 1 32	− 5	i 1 30	?	—
San Francisco		3·4	140	e 0 54	− 1	e 1 43	S*	—	—	—
Santa Clara		3·9	139	e 0 36	−26	e 2 25	+35	—	—	e 3·0
Lick		4·1	137	e 1 3a	− 2	e 1 52	− 3	—	—	—
Reno		4·2	100	e 1 5a	− 2	e 1 36	−21	—	—	—
Fresno		5·5	129	e 1 26a	+ 1	e 2 27	− 3	—	—	—
Tinemaha	z.	6·3	120	i 1 41	+ 5	—	—	—	—	—
Haiwee	z.	7·0	125	i 1 48	+ 2	—	—	—	—	—
China Lake	z.	7·5	125	i 1 53	0	—	—	i 2 8	P*	—
Victoria	z.	8·1	9	e 2 1	− 1	—	—	—	—	—
Pasadena		8·4	136	i 2 4	− 2	e 3 36	− 7	—	—	—
Riverside	z.	8·9	133	e 2 12	0	—	—	—	—	—
Overton	z.	9·2	111	i 2 19	+ 3	—	—	—	—	—
Boulder City		9·2	115	2 27	PP	—	—	—	—	—
Pierce Ferry		9·7	112	i 2 24	+ 2	—	—	—	—	—
Logan		10·1	78	e 2 26	− 3	—	—	—	—	e 5·8
Hungry Horse		11·2	41	e 2 43	− 1	—	—	—	—	—
Tucson		14·1	121	e 3 24	+ 1	—	—	—	—	e 8·6
College		27·8	339	e 5 58	+ 5	—	—	—	—	—
Ottawa		36·1	65	e 7 4	− 1	—	—	—	—	e 19·5

Tucson also gives e =3m.55s., 7m.34s., and 7m.50s.

Jan. 13d. Readings also at 0h. (near Manila), 1h. (Prague, Stuttgart, Collmberg, Strasbourg, Tamanrasset, near Athens, Istanbul, Ili, Frunse, Andijan, near Krasmogorka, Chilisk, and Kurmenty), 2h. (Hungry Horse), 4h. (Apia, Hungry Horse, Tucson, College, Tamanrasset, and near Manila), 5h. (College, Vera Cruz, Guadalajara, near Puebla, Tacubaya, and near Ashkabad), 6h. (Tucson, Pierce Ferry, Overton, China Lake, Hungry Horse, Riverview, Brisbane, Auckland, near Christchurch, Kaimata, Cobb River, Wellington, and New Plymouth), 7h. (Tacubaya, Hungry Horse (2), Tamanrasset, near Chilisk, Kurmenty, Ili, and near Chatra), 10h. (Collmberg), 11h. (Ashkabad), 12h. (Apia), 14h. (Chatra), 15h. (Stuttgart (2) and Brisbane), 16h. (near Dzhergetal, Khorog, and Obi-garm), 18h. (Lunacharskoe, Stalinabad, Kulyab, Fergana, Tashkent, Tchimkent, Samarkand, Dzhergetal, Obi-garm, near Khorog, and Andijan), 19h. (near Ottawa, New Plymouth, near Auckland, Christchurch, Kaimata, Cobb River, and Wellington), 20h. (Huancayo), 21h. (near Tacubaya and and Puebla), 22h. (College, Huancayo, Obi-garm, Fergana, near Khorog, Dzhergetal, Kulyab, and Stalinabad).

Jan. 14d. 10h. 19m. 24s. Epicentre 25°·38. 175°·4W. Depth of focus 0·010.
(as on 1950, September 15d.).

$A = -·9022$, $B = -·0726$, $C = -·4250$; $\delta = -14$; $h = +3$;
$D = -·080$, $E = +·997$; $G = +·424$, $H = +·034$, $K = -·905$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		11·9	17	e 2 56	+ 8	e 4 29	−30	—	—	—
Auckland	N.	14·2	214	e 3 45	PP	i 6 39	SSS	—	—	8·5
Wellington		17·9	205	e 4 6	+ 2	—	—	i 8 43	PcP	e 9·4
Kaimata	N.E.	20·3	209	—	—	e 8 36	sS	—	—	—
Christchurch		20·7	205	4 54	pP	8 52	sS	e 9 46	Q	e 11·4
Brisbane	E.	28·3	259	i 5 51k	+ 5	—	—	i 6 48	PP	—
Riverview		30·2	246	i 6 6a	+ 3	i 13 17	SSS	i 7 16	PPP	e 14·7
Djakarta		76·3	270	e 11 41	+ 1	—	—	—	—	—
Lick	Z.	80·2	41	e 12 0a	− 1	—	—	—	—	—
Berkeley		80·2	41	e 12 1a	0	e 22 0	+ 3	e 12 16	pP	e 32·3
Pasadena		80·3	46	e 12 0	− 2	—	—	i 12 25	pP	e 35·6
Palomar	Z.	80·6	47	12 4	+ 1	—	—	i 12 27	pP	—
Riverside	Z.	80·7	46	e 12 4	0	—	—	e 12 27	pP	—
Fresno		80·9	42	e 12 6a	+ 1	—	—	e 12 29	pP	—
China Lake	Z.	81·7	45	i 12 9	0	—	—	i 12 34	pP	—
Shasta Dam		82·1	38	e 12 10	− 1	—	—	—	—	—
Tinemaha	Z.	82·1	43	e 12 12	+ 1	—	—	—	—	—
Reno		82·8	40	e 12 8	− 7	e 22 33	+10	e 12 29	pP	—
Vladivostok		83·6	324	i 12 15	− 4	e 22 20	−11	i 12 33	pP	—
Boulder City		83·6	46	e 12 21	+ 2	—	—	—	—	—
Tucson		84·0	50	e 12 22	+ 1	e 22 47	+12	e 12 45	pP	e 39·8
Overton	Z.	84·1	45	i 12 22	+ 1	—	—	—	—	—
Pierce Ferry		84·2	46	i 12 22	0	—	—	—	—	—
Logan		88·9	43	e 12 46	+ 1	—	—	e 16 34	PP	e 49·8
Hungry Horse		91·6	36	e 12 54	− 3	—	—	—	—	—
College		92·4	11	e 12 55	− 6	i 23 55	+ 2	e 16 38	PP	e 44·1
Huancayo		93·8	105	—	—	e 23 55	−11	e 24 36	sS	e 44·0
La Paz		97·9	112	13 48	pP	i 24 16	[+23]	17 39	PP	47·6
Kabansk		102·6	321	—	—	e 24 25	[+ 9]	—	—	—
Irkutsk		104·0	321	—	—	e 24 33	[+10]	27 1	SP	—
Weston		116·7	53	e 18 48	pPKP	—	—	—	—	e 59·6
Bombay	N.	117·0	279	—	—	e 25 36?	sSKS	e 35 36	SS	—
Tashkent		124·8	304	20 35?	PP	i 26 0	[+18]	i 27 34	SKKS	—
Stalinabad		125·0	301	e 18 53	[+ 4]	—	—	e 20 39	PP	—
Sverdlovsk		129·3	324	e 31 18	PS	28 6	SKKS	e 33 36	SS	—
Mary		130·3	299	e 19 7	[+ 8]	22 29	PKS	—	—	—
Ashkabad		133·1	299	e 19 30	pPKP	i 22 38	PKS	—	—	—
Kizyl-Arvat		134·7	301	e 19 14	[+ 7]	e 22 50	PKS	—	—	—
Baku		139·5	304	e 19 41	pPKP	—	—	e 22 15	PP	—
Copenhagen		149·1	352	e 19 41	[+ 8]	—	—	—	—	—
Yalta		149·4	316	e 19 41	[+ 8]	—	—	—	—	—
Collmberg	Z.	153·2	348	e 19 49	[+10]	—	—	e 20 2	pPKP	—
Prague		154·1	346	e 19 57	[+17]	—	—	e 20 54	$pPKP_2$	—
Helwan	Z.	155·9	287	e 23 48	PP	—	—	e 24 1	PP	—
Stuttgart		156·3	353	e 19 58	[+15]	—	—	e 20 24	pPKP	e 89·6
Paris		156·5	4	e 20 11	PKP_2	—	—	i 23 41	PP	e 81·6
Strasbourg		156·6	354	e 20 0	PKP_2	—	—	e 20 18	$pPKP_2$	—
Besançon		158·0	357	e 20 19	PKP_2	—	—	—	—	—
Tamanrasset	Z.	177·3	—	e 20 7	[+ 8]	—	—	e 20 32	pPKP	86·6

Additional readings :—
Apia i = 4m.5s.
Auckland eN = 4m.29s., eS?N = 7m.19s.
Wellington e = 4m.56s.
Brisbane iPPPEZ = 7m.0s.
Riverview iPPPE = 7m.30s.
Lick eZ = 12m.55s.
Fresno eZ = 14m.26s.
Reno ePPE = 15m.8s.
Tucson e = 13m.13s. and 14m.2s., esS = 23m.7s., e = 24m.46s., eSS? = 29m.9s., e = 30m.2s.

Continued on next page.

Huancayo eSS = 30m.58s.
La Paz iZ = 18m.8s., iSS = 32m.0s.
Tashkent iSKSP = 30m.32s.
Collmberg eZ = 20m.27s.
Prague i = 20m.5s., ePKP$_2$ = 20m.24s., e = 20m.42s., esPKP$_2$ = 21m.3s.
Helwan iZ = 25m.27s.
Paris e = 20m.25s. and 21m.56s.
Tamanrasset eZ = 22m.0s., ePKP$_2$Z = 22m.13s., epPKP$_2$Z = 22m.24s.. eZ = 25m.42s., ePPZ = 25m.57s., epPPZ = 26m.21s., ePcP,PKPZ = 28m.59s.
Long waves were also recorded at Perth, Bogota, Santa Clara, Palisades, Harvard, Saskatoon, Ottawa, Seven Falls, Granada, and De Bilt.

Jan. 14d. 12h. 46m. 42s. Epicentre 46°·3N. 7°·5E. (as on 1950, September 15d.).

Central Valais. Intensity V at Montana, III at Evelona.
Epicentre 46°·3N. 7°·4E. Macroseismic radius 12km.

E. Wanner.
Jahresbericht des Erdbebendienstes der. Schweiz im Jahre, 1951, Zürich, 1952, p. 2. Macroseismic chart, fig. 2.

$A = +·6874$, $B = +·0905$, $C = +·7206$; $\delta = -3$; $h = -4$;
$D = +·131$, $E = -·991$; $G = +·714$, $H = +·094$, $K = -·693$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Neuchatel		0·8	332	i 0 17	− 1	e 0 28	− 3	—	—	—
Basle		1·3	3	e 0 24	− 1	e 0 42	− 2	—	—	—
Zürich		1·3	35	e 0 24	− 1	e 0 44	0	i 0 26	P_g	—
Besançon		1·4	312	—	—	i 0 45	− 1	—	—	—
Chur		1·5	68	e 0 31	+ 3	e 0 50	+ 1	—	—	—
Strasbourg		2·3	5	e 0 51?	P_g	e 1 34	L	—	—	(e 1·6)
Stuttgart	z.	2·7	24	0 47?	+ 2	e 1 28	S_g	e 0 55	P_g	—

Stuttgart also gives eP*Z = 50s., eZ = 52s.

Jan. 14d. Readings also at 0h. (Tamanrasset, Tacubaya, and near Athens), 1h. (Tamanrasset, Reno, China Lake, Shasta Dam, Boulder City, Overton, Pierce Ferry, Hungry Horse, Riverside, Palomar, Pasadena, Lick, College, and Brisbane), 2h. (College and Chatra), 4h. (Hungry Horse, Kodaikanal, and Grahamstown), 6h. (China Lake, Riverside, Overton, Pierce Ferry, Tucson, La Paz, near Huancayo, Wellington, Auckland, Christchurch, Kaimata, New Plymouth, and Brisbane), 8h. (Pierce Ferry and near Manila), 10h. (Tacubaya), 11h. (Tucson, Overton, China Lake, Boulder City, Tinemaha, Palomar, Pasadena, College, Paris, Strasbourg, Ravensburg, Stuttgart (2) and Kew), 12h. (Kulyab, Tashkent, near Tchimkent, Fergana, Dzhergetal, Obi-garm, Andijan, and Khorog), 13h. (Kaimata, Christchurch, Chatra, Kulyab, Obi-garm, near Khcrog, Dzhergetal, Ili, Kurmenty, and Naryn), 15h. (Apia, College, and Hungry Horse), 16h. (Stuttgart), 17h. (near Tacubaya), 18h. (Hungry Horse, Pasadena, Palomar, Tinemaha, Riverside, China Lake, Pierce Ferry, Tucson, Boulder City, and Chatra), 19h. (Christchurch), 21h. (Lunacharskoe, Frunse, near Khorog, Obi-garm, Kulyab, Andijan, Fergana, Tchimkent, Tashkent, Stalinabad, and Samarkand), 22h. (Rybach'e, Frunse, Khorog, Andijan, near Ili, Chilisk, Almata, Naryn, Kurmenty, Kulyab, Obi-garm, and Stalinabad).

Jan. 15d. 4h. 12m. 12s. Epicentre 14°·9S. 167°·1E. Depth of focus 0·010.
(as on 1950, November 4d.).

$A = -·9424$, $B = +·2158$, $C = -·2555$; $\delta = -3$; $h = +6$;
$D = +·223$, $E = +·975$; $G = +·249$, $H = -·057$, $K = -·967$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		18·1	224	i 4 5k	− 1	e 7 13	− 9	i 4 31	pP	—
Apia		20·5	90	i 4 37	+ 5	i 8 25	+14	i 4 59	pP	—
Auckland	N.	22·9	164	i 4 56	0	16 7	ScS	—	—	—
Riverview		23·7	214	i 5 6	+ 2	i 9 13	+ 5	i 5 23	pP	—
New Plymouth	E.	24·9	166	e 4 58	−17	—	—	—	—	—
Tuai	N.	25·4	162	e 5 20	0	—	—	—	—	—
Wellington		27·1	167	i 5 35	− 1	i 10 7	+ 2	i 6 2	pP	12·8
Kaimata	N.E.	27·8	173	i 5 43	+ 1	e 10 18	+ 2	—	—	—
Christchurch		28·9	171	i 5 51	− 1	i 10 36	+ 2	i 6 48	PP	12·1
Guam		35·8	320	8 10	PP	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Perth		49·5	241	i 9 26	pPcP	i 15 46	+ 5	19 13	SS		24·1
Honolulu		49·8	45	e 8 54	+ 9	e 15 47	+ 1	i 16 33	sS	e	20·2
Manila		54·2	301	e 9 19	+ 1	i 16 53	+ 7	e 9 44	pP	e	23·0
Tokyo		56·6	334	9 45	+10	17 37	PPS	10 38	pP		30·0
Onahama		57·2	336	9 58	pP	17 26	+ 1	—	—		—
Utunomiya		57·3	334	9 39	− 1	17 52	PS	—	—		30·2
Nagoya		57·4	332	10 40	+59	17 31	+ 3	—	—		—
Sumoto		57·8	330	9 45	+ 1	17 32	− 1	—	—		22·3
Koti		57·9	328	10 2	pP	17 36	+ 1	13 26	PPP		—
Matusiro		58·0	333	10 4	pP	17 20	−16	12 6	PP		—
Kagosima		58·0	323	9 45	0	17 38	+ 2	—	—		—
Hukusima		58·0	337	9 46	+ 1	17 36	0	—	—		—
Nagano		58·1	333	9 46	0	17 42	+ 5	10 44	pP		—
Sendai		58·3	337	9 50	+ 3	16 33	−67	12 16	PP		—
Toyooka		58·7	330	10 37	PcP	18 30	PPS	—	—		—
Mizusawa		59·0	337	10 13	pP	17 47	− 2	—	—		—
Aikawa		59·2	334	9 53	0	17 49	− 3	—	—		—
Hukuoka		59·6	325	9 54	− 2	17 49	− 8	—	—		28·6
Djakarta		59·7	272	i 9 56	− 1	i 18 2	+ 4	—	—		—
Nanking		65·7	316	10 36	0	i 19 13	0	i 11 16	pP		—
Vladivostok		66·1	333	i 10 40	+ 1	i 19 18	0	i 11 0	pP		—
Ukiah		84·2	48	e 13 7	pP	e 22 21	−16	e 15 40	PP	e	34·4
Berkeley		84·4	49	i 12 24k	+ 1	e 22 38	− 1	e 12 51	pP	e	34·6
Santa Clara		84·4	49	e 12 20	− 3	e 22 38	− 1	i 13 13	pP	e	44·5
Kabansk		84·6	327	e 12 24	0	22 37	− 4	i 12 50	pP		—
Lick	Z.	84·6	49	e 12 24a	0	—	—	e 12 56	pP		—
Shasta Dam		85·5	46	i 12 29	+ 1	—	—	—	—		—
Calcutta	E.	85·6	294	i 13 1	+32	23 3	+12	13 19	pP		—
Fresno	Z.	85·8	50	e 12 30k	0	24 34	PPS	12 58	pP		—
Mineral	Z.	85·9	47	i 12 30k	0	—	—	i 12 58	pP		—
Irkutsk		86·0	327	e 12 31	0	22 48	[+ 3]	i 12 54	pP		—
Pasadena		86·1	54	i 12 32	+ 1	i 23 0	+ 4	i 12 57	pP	e	35·5
Sitka		86·3	28	e 20 26	?	i 22 50	[+ 4]	e 24 0	sS	e	35·1
College		86·5	18	e 12 31	− 2	i 22 48	[+ 1]	i 12 57	pP	e	35·3
Riverside		86·6	54	i 12 34	0	—	—	i 12 56	pP		—
Reno		86·8	48	e 12 36k	+ 1	e 22 54	[+ 5]	e 13 2	pP		—
Palomar	Z.	86·8	55	i 12 35	0	—	—	i 12 57	pP		—
Tinemaha		87·1	51	i 12 37	+ 1	—	—	e 13 8	pP		—
China Lake	Z.	87·1	52	i 12 36	0	—	—	i 13 2	pP		—
Chatra		87·9	298	i 12 42	+ 2	e 22 48	[− 9]	23 39	sSKKS		—
Victoria	Z.	88·0	39	e 12 42	+ 2	—	—	—	—		—
Seattle		88·3	40	i 13 14a?	+32	e 24 8	+51	i 14 1	pP		—
Boulder City		89·3	53	i 12 48	+ 2	e 23 12	[+ 6]	—	—		—
Overton	Z.	89·7	52	i 12 50	+ 2	—	—	—	—		—
Pierce Ferry		90·0	53	i 12 50	0	i 23 14	[+ 4]	i 13 23	pP		—
Tucson		91·3	57	i 12 57	+ 1	23 20	[+ 3]	i 13 22	pP	e	37·6
Kodaikanal	Z.	92·2	281	i 13 10	+10	i 23 25	[+ 3]	24 20	pS		—
Salt Lake City		93·0	48	e 13 38	pP	i 23 28	[+ 1]	i 24 25	sS	e	38·8
Logan		93·3	47	e 13 33	pP	i 23 31	[+ 2]	i 25 51	pPS	e	42·5
Hungry Horse		93·8	41	i 13 6	− 1	i 23 33	[+ 1]	e 16 43	PP		—
Butte		94·0	43	—	—	e 23 35	[+ 2]	e 34 51	sSSS	e	38·4
Bozeman		94·9	44	—	—	e 23 40	[+ 2]	e 24 20	S	e	38·4
Dehra Dun	N.	96·6	299	e 19 8	PPP	—	—	—	—		—
New Delhi	N.	96·9	298	e 17 39	PP	i 23 46	[− 2]	i 24 24	S		40·2
Poona		97·6	287	i 13 25	0	i 23 53	[+ 1]	13 51	pP		—
Tacubaya		98·2	72	e 17 35	PP	e 24 50	+ 7	e 16 21	?		—
Bombay		98·7	287	e 13 34	+ 4	i 24 47	0	i 24 0	SKS		45·0
Saskatoon		99·3	39	—	—	e 24 0	[0]	—	—		41·8
Rapid City	E.	100·0	47	e 17 44	PP	e 24 57	− 1	i 24 5	SKS	e	42·4
Almata		100·2	313	i 14 2	pP	—	—	e 18 2	PP		—
Naryn		100·5	310	i 14 5	pP	—	—	i 18 5	PP		—
Frunse		101·8	312	e 14 8	pP	i 25 2	SKKS	e 18 8	PP		—
Andijan		103·1	309	14 13	pP	i 25 8	SKKS	18 26	PP		—
Fergana		103·5	309	e 17 42?	PP	e 24 22	[+ 2]	—	—		—
Lincoln	E.	104·3	51	—	—	e 24 23	[− 1]	e 27 27	PS	e	48·5

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kulyab		104·7	306	e 14 25	pP	—	—	—	—	—
Obi-garm		104·9	307	i 14 21	pP	—	—	18 38	PP	—
Tchimkent		105·4	311	e 14 22?	pP	i 24 30?	[+ 1]	—	—	—
Lunacharskoe		105·5	310	e 18 33	PP	—	—	—	—	—
Tashkent		105·5	310	e 14 22?	pP	i 27 44	PS	i 18 40	PP	—
Stalinabad		105·6	307	i 14 24	pP	i 24 32?	[+ 2]	e 14 54	pP	—
Resolute Bay		106·4	16	20 57	PPP	—	—	—	—	—
Florissant		108·9	53	—	—	e 24 45	[+ 1]	e 25 30	sSKS	—
St. Louis		109·0	53	e 18 54	PP	e 24 39	[− 6]	i 25 33	sSKS	—
Mary		110·9	305	18 51	PP	—	—	—	—	—
Chicago		111·1	49	19 50	pPP	e 24 56	[+ 3]	e 28 26	PS	e 45·9
Sverdlovsk		111·4	325	14 52	pP	i 28 37	PS	i 19 25	PP	—
Tananarive		111·7	242	27 30	?	34 48	SS	29 9	PS	51·5
Huancayo		112·6	110	e 19 12	PP	e 25 8	[+ 9]	e 35 0	SS	e 45·3
Ashkabad		113·7	305	e 18 58	[+31]	—	—	—	—	—
La Plata	E.	114·6	140	19 13	PP	24 48	[−19]	30 6	SPP	53·5
Kizyl-Arvat		115·3	306	e 18 58	pPKP	—	—	—	—	—
Cleveland		115·7	50	i 18 34k	[+ 3]	i 25 13	[+ 2]	i 19 2	pPKP	—
Columbia		116·2	59	—	—	e 25 13	[0]	e 29 18	PS	e 57·3
La Paz		117·2	117	e 18 10	[−24]	i 25 20	[+ 4]	i 19 48	PP	55·9
Buffalo		117·6	49	—	—	e 25 19	[+ 1]	e 29 31	PS	—
Pennsylvania		118·5	51	e 20 11	PP	i 25 0	[−21]	i 20 36	pPP	—
Bogota		119·0	92	e 20 10	PP	i 29 55	PS	e 20 35	pPP	54·8
Grahamstown	Z.	119·0	218	e 18 39	[+ 1]	—	—	—	—	—
Ottawa		119·5	45	e 18 38k	[− 1]	25 24	[− 1]	19 8	pPKP	—
Baku		120·2	308	e 19 57	PP	—	—	—	—	—
Philadelphia		120·6	52	e 20 33	PP	i 25 21	[− 7]	i 30 33	pPS	e 51·0
Lenkoran		121·2	307	20 40	pPP	23 6	PKS	e 30 24	PS	—
Palisades		121·4	50	i 18 44	[+ 2]	e 25 32	[+ 1]	i 19 11	pPKP	e 56·8
Fordham		121·5	50	e 18 39	[− 3]	e 25 35	[+ 4]	—	—	—
Seven Falls	E.	122·5	43	18 52	[+ 8]	25 37	[+ 2]	30 25	PS	—
Grozny		122·8	312	19 17	pPKP	—	—	—	—	—
Harvard		122·9	48	e 18 45	[0]	e 37 43	sSS	i 19 18	pPKP	e 67·7
Weston		123·1	48	e 18 47	[+ 2]	e 38 42	sSSP	e 19 11	pPKP	—
Pretoria	Z.	123·1	225	i 20 51	pPP	—	—	—	—	—
Tiflis		123·8	310	e 18 56	[+ 9]	—	—	—	—	—
Moscow		123·9	328	e 19 16	pPKP	e 30 40	PS	e 20 53	pPP	—
Gori		124·2	310	e 19 29	pPKP	—	—	—	—	—
Scoresby Sund		124·2	4	e 18 48	[+ 1]	i 25 42	[+ 2]	37 20	SS	—
Leninakan		124·7	310	e 19 16	pPKP	—	—	—	—	—
Abastumanj		125·2	311	e 18 56	[+ 7]	—	—	—	—	—
Pulkovo		125·2	335	e 19 18	pPKP	e 30 58	PS	e 21 3	PP	—
Sotchi		127·0	314	e 19 22	pPKP	—	—	—	—	—
Helsinki		127·1	338	e 19 5	[+12]	e 31 8	PS	e 19 22	pPKP	e 56·8
Ivigtut		127·3	21	e 19 21	pPKP	25 54	[+ 5]	—	—	55·8
San Juan		129·0	77	i 18 59	[+ 2]	e 22 22	SKP	i 19 31	pPKP	e 50·4
Upsala		129·9	340	e 21 30	PP	e 38 37	SS	e 33 2	PPS	e 56·8
Bermuda		130·0	60	e 21 59	sPP	e 22 23	SKP	e 32 54	SPP	e 52·1
Yalta		130·5	316	e 19 28	pPKP	—	—	—	—	—
Ksara		132·2	302	i 19 32	pPKP	—	—	21 50	pPP	—
Kishinev		132·8	322	e 19 31	pPKP	e 23 0	pPKS	—	—	—
Fort de France		133·4	84	e 21 5	?	—	—	—	—	—
Lwow		134·0	327	i 21 59	sPP	i 23 2	pPKS	i 33 42	PPS	—
Copenhagen		134·9	340	i 19 38	pPKP	40 18	SSP	22 2	PP	49·8
Istanbul		135·3	314	e 19 14	[+ 5]	e 23 12	pPKS	e 22 14	PP	—
Bucharest	N.	135·8	320	e 22 12	PP	e 23 10	pPKS	—	—	—
Skalnate Pleso		136·4	328	19 57	?	e 45 7	SSS	e 32 12	SP	—
Helwan	Z.	136·7	297	e 19 11	[0]	22 54	PKS	e 22 6	PP	—
Aberdeen	E.	137·0	351	i 33 26	pPPS	i 39 11	sSS	—	—	e 67·5
Potsdam		137·5	337	i 22 23	pPP	—	—	—	—	e 62·8
Collmberg		138·1	335	e 19 18	[+ 4]	e 22 36	SKP	e 19 43	pPKP	e 63·3
Ogyalla		138·3	328	e 21 6	?	26 24	[+11]	e 28 24	SKKS	—
Sofia		138·4	319	e 19 49	pPKP	—	—	e 24 34	pPP	—
Prague		138·5	333	e 19 18	[+ 4]	e 26 19	[+ 6]	i 19 42	pPKP	e 59·3
Vienna		138·9	330	e 19 43	pPKP	—	—	22 34	pPP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Belgrade		139·0	323	e 19 44	pPKP	e 29 9	SKKS	e 41 7	PSP		e 73·6
Jena		139·0	335	e 19 15?	[0]	e 26 37	[+23]	e 19 54	pPKP		—
Durham	N.	139·3	350	i 22 28	PP	i 23 25	PKS	—	—		—.
De Bilt		140·2	342	i 22 40	pPP	e 40 38	SS	25 41	PPP		e 60 8
Rathfarnham Castle		141·3	353	e 19 48	pPKP	41 18	SSP	e 22 46	PP		63·8
Stuttgart		141·7	336	e 19 18	[− 2]	e 40 48	SS	e 19 49	pPKP		72·8
Karlsruhe	z.	141·8	337	e 19 23	[+ 3]	—	—	e 19 53	pPKP		—.
Triest		142·0	329	e 19 57	pPKP	i 27 13	sSKS	i 29 13	SKKS		e 52·8
Strasbourg		142·3	337	e 19 22	[+ 1]	e 26 30	[+11]	e 19 52	pPKP		e 62·8
Zürich		143·0	336	e 19 21	[− 1]	e 29 16	SKKS	19 46	pPKP		—
Chur		143·1	334	e 19 21	[− 2]	—	—	e 19 49	pPKP		—
Basle		143·3	337	e 19 24	[+ 1]	—	—	e 19 50	pPKP		—
Taranto		143·4	320	19 0	[−23]	—	—	—	—		67·1
Salo		143·6	332	e 19 27	[+ 3]	—	—	e 19 54	pPKP		—
Paris		143·9	342	i 19 26	[+ 2]	i 26 20	[− 2]	i 19 52	pPKP		e 62·8
Bologna		144·0	330	e 19 28	[+ 4]	—	—	e 20 5	pPKP		—
Pavia	z.	144·0	333	e 19 28	[+ 4]	—	—	e 19 36	PKP_2		—
Neuchatel		144·0	336	e 19 24	[0]	e 29 25	SKKS	—	—		—
Besançon		144·1	337	e 19 27	[+ 3]	—	—	i 20 0	pPKP		—
Prato		144·6	329	e 19 25	[0]	—	—	i 19 55	pPKP		—
Florence		144·6	329	e 19 30	[+ 5]	e 29 26	SKKS	e 19 56	pPKP		—
Rocca di Papa		145·3	326	e 19 33	[+ 6]	—	—	e 20 0	pPKP		—
Rome		145·3	326	i 19 31	[+ 4]	i 26 35	[+11]	i 20 48	$pPKP_2$		e 69·1
Messina		145·8	318	e 19 34	[+ 7]	—	—	20 51	$pPKP_2$		—
Clermont-Ferrand		146·4	339	i 19 30	[+ 2]	e 41 42	SS	i 26 27	PPP		e 54·4
Tortosa		151·7	338	i 20 13	pPKP	i 30 5	SKKS	34 4	SKSP		e 67·8
Toledo		153·9	344	e 19 45	[+ 5]	48 30	SSS	e 20 6	PKP_2		64·6
Alicante		154·2	337	20 16	pPKP	27 27	[+52]	20 51	PKP_2		e 71·6
Almeria		156·2	339	i 20 6	pPKP	43 56	SS	i 20 28	PKP_2		78·3
Granada		156·3	342	i 20 13k	pPKP	i 43 46	SS	20 23	PKP_2		i 80·1
Malaga		157·0	342	i 20 8	pPKP	27 4	[+26]	i 20 42	PKP_2		75·4
Tamanrasset	z.	160·9	298	e 19 55	[+ 7]	e 30 36	SKKS	i 20 25	pPKP		—

Additional readings :—
Brisbane iE =4m.26s., iN =7m.29s., iE =7m.58s.
Apia iZ =5m.11s., i =5m.31s., iZ =5m.57s.
Riverview isPEN =5m.37s., iEN =5m.42s., iPPE =5m.58s., iN =6m.13s., iPcPE = 8m.51s., isSE =9m.48s., iSSE =10m.23s., iScSEN =16m.7s.
Tuai eN =14m.39s.
Wellington iPP =6m.27s., PcP? =9m.14s., SS =11m.21s., ScS =16m.14s.
Christchurch eSE =10m.58s., ScS?E =16m.18s.
Perth PP =11m.8s., PS =16m.28s., i =22m.5s.
Honolulu epP =9m.9s., esP =9m.20s., ePPP =12m.7s.
Manila iPPN =11m.29s., iPPPN =12m.49s.
Tokyo PP =11m.42s., ScS =18m.52s.
Matusiro pP =11m.1s., pPP =13m.34s.; pP given as P.
Nagano pPP =12m.38s., sPP =13m.33s.
Sendai PPP =13m.8s.
Mizusawa PE =10m.16s.
Nanking PcPZ =10m.45s., i =10m.59s. and 13m.24s., iE =15m.3s., iScS?E =19m.49s., i =19m.55s.
Ukiah ePPP =17m.43s., eSS =27m.23s.
Berkeley esPZ =13m.2s., eZ =13m.24s., epPPZ =16m.6s., esPP?Z =24m.9s., eSS?Z =28m.32s.
Santa Clara esSE =23m.33s.
Calcutta sSE =23m.35s.
Fresno eZ =14m.42s., ePKP,PKPZ =38m.32s.
Pasadena isPZ =13m.3s., iPPZ =15m.49s., isPPZ =16m.18s., ipSN =23m.49s., iEZ = 24m.14s.
Sitka epS =23m.46s.
College isP =13m.18s., e =15m.26s. and 22m.50s., isS =23m.33s., eSS? =27m.41s., ePKKP =30m.29s., e =31m.31s., ePKP,PKP =38m.23s.
Reno eN =13m.20s.
Seattle i =13m.32s. and 13m.43s., isP =14m.24s., i =14m.57s. and 15m.9s.
Pierce Ferry i =14m.34s.
Tucson isP =13m.37s., e =15m.1s., i =15m.8s., epPP =17m.2s., ePPP? =19m.9s., eS = 23m.40s., esS =24m.38s., eSS =30m.17s., ePKKP =30m.20s., ePKP,PKP =39m.7s.
Sale Lake City ePP =16m.46s., eSKKS =23m.35s., eSS =30m.6s., eSSS =34m.22s.
Logan ePP =16m.51s., ePPP =18m.54s., eSS =28m.39s., e =30m.2s., eSSS =33m.59s., e =38m.51s.

Continued on next page.

Hungry Horse ePKKP =29m.50s., iPKP,PKP =39m.23s.
Butte epS =24m.53s.
Bozeman ePS =25m.10s., e =29m.14s., eSS? =32m.6s.
New Delhi iN =25m.16s., SSN =29m.20s.
Poona PPE =16m.48s., SKSE =23m.33s., SKKSE =23m.43s., sSE =24m.42s., PSE = 25m.2s., PPSE =25m.27s., SSE =28m.57s., SSSE =33m.4s.
Tacubaya e =19m.9s.
Bombay iE =25m.36s., iN =25m.40s., QN =40m.18s.
Rapid City ePSE =26m.37s., eSSE =31m.21s., eSSSE =36m.12s.
Frunse ePPP =20m.6s.
Lincoln eE =25m.11s., eSSE =33m.38s.
Andijan PS =27m.30s.
Tashkent iPPP =20m.52s.
Stalinabad iPP =18m.38s., SKKS =25m.20s., sS =26m.32s.
Resolute Bay eZ =24m.16s., PP =25m.18s., SKS =31m.25s. and 32m.21s. : readings wrongly identified.
Florissant eS =26m.18s., i =26m.31s. and 27m.8s., eSP =28m.0s.
St. Louis epPP =19m.27s., epPPP? =21m.44s., eS =26m.20s., e =27m.3s., eSP = 27m.58s.
Chicago e =24m.57s., eSKKS =25m.34s., eSS =34m.20s., eSSS =38m.16s.
Sverdlovsk iPPP =21m.38s., pPPP? =21m.59s.
Huancayo e =20m.3s., eSKSP? =28m.59s., e =31m.48s., esSS =35m.44s.
La Plata N =24m.56s. and 25m.36s., PSE =28m.36s., N =28m.42s. and 30m.18s., SSE = 34m.42s., E =35m.36s., SSSE =39m.12s., N =42m.54s. and 49m.48s., Q =49m.54s.
Cleveland esSKSE =26m.9s., eSKKSE =26m.26s., eN =28m.0s., iPSE =29m.16s., epPSE =29m.50s., eSSE =35m.27s., eE =36m.9s.
La Paz PPP =22m.24s., iPS =29m.36s., PPS =30m.43s., iSS =36m.0s., iSSS =40m.2s.
Pennsylvania iSKKSEN =26m.19s., iSN =27m.20s., eSP?N =29m.18s., iPS?E = 29m.39s., iSSE =35m.46s., iN =37m.31s.
Bogota eSSEN =36m.27s.
Ottawa i =22m.7s., SKKS =26m.20s., PS =29m.33s., SS =36m.48s.
Philadelphia eSKKS =26m.10s., ePS =29m.45s., e =32m.18s., eSS =36m.32s.
Palisades iSKKS =27m.4s., ePS =30m.7s., iPPS =31m.37s., eSS =36m.56s.
Fordham e =28m.54s.
Seven Falls PPPE =23m.17s., SSE =37m.25s.
Harvard isPKP =19m.30s., esPP =21m.11s., eSKSP =30m.26s., eSPP =31m.37s., e = 33m.0s.
Scoresby Sund e =19m.14s. and 19m.33s., PP =20m.56s., pPP =21m.19s. ; 26m.27s., 30m.21s., 31m.1s., and 37m.59s., SSS =42m.0s.
Pulkovo ePPP =23m.40s.
Sotchi eSKKS =21m.40s.
Helsinki e =21m.15s., eNZ =21m.25s., eE =22m.37s., ePPPZ =23m.58s., ePPSE = 32m.52s., eE =45m.53s.
San Juan esPP =21m.48s., iPKS =22m.12s., ePPP =23m.52s., e =28m.24s. and 29m.57s. eSKSP =31m.13s., eSS =37m.32s.
Upsala e =22m.12s., ePKS =22m.48s., ePKSN =22m.58s., ePPP =24m.22s., eE = 27m.56s., eSKKSE =28m.27s., e =34m.6s., eN =37m.25s., eE =43m.7s., eSSSN = 43m.37s.
Bermuda e =28m.56s., 32m.33s., and 34m.19s., eSS =37m.15s., eSSS? =40m.58s.
Lwow eSKKS =28m.23s.
Copenhagen i =22m.33s., PKS =23m.11s., PPP =25m.8s., 28m.22s., 29m.32s., and 35m.24s., SSS =44m.36s.
Istanbul eZ =21m.52s., eE =22m.2s., eEN =24m.6s., ePS?E =32m.9s., ePPSE =34m.20s.
Skalnate Pleso ePP =22m.19s., eSKP =22m.33s., esPPN =22m.54s., esSKP =23m.16s., e =24m.48s. and 25m.53s., eN =26m.20s., eSKKS =28m.9s., e =28m.38s., eSKKPE =31m.24s., eSKSPN =31m.48s.?, ePPS =34m.20s., eSS =40m.15s., esSS? = 40m.56s.
Helwan eZ =19m.20s., 19m.42s., 20m.28s., and 20m.48s., iPPEZ =22m.21s., iEZ = 23m.26s., PPPZ =25m.30s., eE =35m.0s., eN =40m.36s.
Aberdeen iE =38m.17s., iSSSE =43m.42s., eE =57m.40s.
Potsdam iEN =23m.19s. and 24m.3s., iN =28m.45s.
Collmberg eZ =22m.26s., eE =23m.30s., eZ =23m.35s.
Ogyalla ePP =22m.24s., esPPE =23m.0s., e =23m.8s., esSKP? =23m.34s., eN =23m.53s., e =25m.6s.?, eSPE =32m.36s., e =34m.54s., eSS? =40m.48s.
Prague e =19m.32s., epPKP =19m.58s., esPKP =20m.12s., e =20m.32s. and 21m.22s., eSKP =22m.30s., ePKS =22m.41s., e =22m.54s. and 23m.6s., epSKP =23m.23s., esSKP =23m.36s., e =24m.28s. and 25m.26s., ePPP =25m.43s., e =26m.48s., 29m.30s., and 33m.8s., eSPP? =34m.21s., ePPS =34m.58s., eSS =40m.36s., esSS = 41m.36s., eSSS =46m.42s.
Belgrade eZ =22m.19s., eNW =22m.50s., iPKSNE =23m.16s., eSKSPNE =32m.50s., eNE =37m.17s., eNW =39m.8s.
Jena eN =19m.42s., ePPE =22m.32s., eSKP?E =22m.57s., eSKP?N =23m.9s., eE = 23m.36s., ePPP?N =25m.41s., eE =29m.22s.
De Bilt ePKS =23m.30s., eN =36m.18s.
Stuttgart eZ =19m.41s., 19m.52s., 20m.56s., and 21m.7s., ePP =22m.48s., eSKPZ = 23m.5s., e =23m.37s., ePPP =25m.48s., eSKKS =29m.12s., eS =31m.13s., ePSKS = 33m.6s., ePSZ =33m.54s., ePPS =35m.24s., e =36m.30s., eSSS =46m.54s., eQ = 63·8m.

Continued on next page.

Rathfarnham Castle e =21m.47s. and 26m.59s., iZ =28m.22s., eSPEN =33m.8s., ePPS = 35m.28s., eSSS =50m.2s.
Triest iPP =22m.49s.?, iSKP =23m.38s., iPPP =25m.57s., iPSKS =32m.59s., iSS = 41m.41s.
Strasbourg e =19m.44s. and 19m.59s., esPKP =20m.6s., e =20m.45s., i =21m.1s., e = 21m.19s. and 22m.31s., ePP =22m.46s. and 22m.55s., ePPP =25m.56s., e =27m.9s. and 27m.58s., ePS =33m.11s., ePPS =35m.10s., e =36m.46s., eSS =41m.5s. and 41m.22s., e =45m.58s., eSSS =46m.54s., e =50m.21s. and 53m.48s.
Zürich ePP =22m.41s.
Chur ePP =22m.46s.
Basle e =23m.59s.
Salo iZ =19m.59s., eZ =21m.19s., ePP?E =23m.33s.
Paris iPP =23m.0s. and 23m.6s., ipPP =23m.28s., iPPP =26m.7s., iSKKS =29m.15s., eSPP =35m.8s., iPPS =35m.29s., iS =45m.44s., iSS =41m.20s., iSSP =41m.51s., iSSS =47m.9s., and many unidentified readings.
Bologna e =23m.26s.
Pavia e =19m.51s. and 20m.0s.
Beasnçon e =19m.47s., 20m.18s., 21m.29s., and 21m.48s., ePP =23m.4s., epPP = 23m.38s., e =24m.5s.
Florence PP? =23m.35s., eSKS =26m.52s., eSS =42m.30s.
Rome iPKP$_2$Z =19m.55s., iPPZ =23m.11s., ePSKSN =33m.5s., iPPSE =36m.5s., iSSN =42m.5s., iE =42m.40s.
Messina ePKP$_2$Z =19m.55s., PP =23m.16s.
Clermont-Ferrand i =19m.3s., 19m.11s., and 21m.10s., isPP? =23m.50s., i =24m.29s., 25m.17s., and 25m.58s., ePKKP? =32m.16s., e =34m.38s.
Tortosa iPKP$_2$?N =20m.53s., PPS?E =38m.8s., SSN =43m.49s.
Toledo i =20m.19s. and 20m.32s., e =23m.3s., ePP =24m.0s.
Alicante pPKP =24m.27s., PPP =29m.29s., SS =44m.5s., SSP =45m.5s., SSS =49m.47s., Q =63m.35s.
Almeria iPP =23m.58s., PPP =30m.48s.?
Granada PKP$_2$ =20m.43s., SKP =23m.8s., iPP =24m.18s., pPP =24m.28s., PPP = 27m.50s., iSKKS =30m.50s., SKSP =34m.38s., PPS =37m.23s., SSP =46m.20s., SSS =49m.32s., Q =74m.30s.
Malaga iPP =24m.8s., PPP =27m.50s., SKKS =31m.6s., Q =67m.18s.
Tamanarsset iPKP$_2$?Z =21m.9s., eZ =21m.17s., pPKP$_2$?Z =21m.58s., ePPZ =24m.49s., ePPPZ =28m.8s., eZ =30m.10s.
Long waves were also recorded at Halifax.

Jan. 15d. 10h. 32m. 0s. Epicentre 5°·7S. 134°·1E. (as on 1943, Nov. 6d.).

$A = -\cdot6925$, $B = +\cdot7146$, $C = -\cdot0987$; $\delta = -5$; $h = +7$;
$D = +\cdot718$, $E = +\cdot696$; $G = +\cdot069$, $H = -\cdot071$, $K = -\cdot995$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Djakarta		27·1	268	6 17	+31	—	—	—	—	—
Brisbane		28·2	143	e 6 12	+16	e 10 51	+10	—	—	—
Riverview		32·2	153	e 6 54	+22	e 12 0	+15	—	—	e 16·5
Vladivostok		48·6	358	e 8 46	− 1	e 15 38?	−11	—	—	—
Christchurch		50·6	144	e 16 30	PS	e 21 0	SSS	e 23 0	Q	e 24·9
Kabansk		62·1	341	e 10 24	− 1	18 45	− 4	—	—	—
Irkutsk		63·1	340	e 10 28	− 4	e 18 53	− 9	—	—	—
Khorog		72·2	312	e 11 33	+ 4	—	—	—	—	—
Andijan		72·9	316	e 11 33	0	i 20 55?	− 4	—	—	—
Fergana		73·2	315	e 11 34	− 1	—	—	—	—	—
Kulyab		73·7	312	e 11 38	0	—	—	—	—	—
Obi-garm		74·0	313	i 11 41	+ 2	—	—	—	—	—
Lunacharskoe		75·3	315	e 11 39	− 8	—	—	—	—	—
Tashkent		75·3	315	e 11 52	+ 5	—	—	—	—	—
Tchimkent		75·4	316	e 11 46	− 1	e 21 25	− 2	—	—	—
Samarkand		76·3	313	e 12 0	+ 8	—	—	—	—	—
Mary		79·6	310	e 12 11	+ 1	—	—	—	—	—
Sverdlovsk		85·8	328	12 41	− 1	23 6	− 9	—	—	—
College		90·1	24	e 13 3	0	—	—	—	—	—
Pierce Ferry		111·0	53	e 19 12	PP	—	—	—	—	—
Rome		117·1	314	—	—	e 32 27	?	—	—	e 66·2
Tamanrasset	z.	127·6	294	e 19 14	[+ 7]	—	—	e 21 9	PP	—
Huancayo		145·8	121	e 19 52	[+11]	—	—	—	—	—
La Paz		148·8	136	e 19 0	[−46]	—	—	20 3	PKP	75·5

Additional readings :—
Brisbane eE =6m.16s., iE =14m.40s., eZ =15m.13s., iEN =15m.46s.
Tamanrasset eZ =22m.1s.
Long waves were also recorded at Wellington, Auckland, Almeria, Granada, Taranto, Strasbourg, Paris, Kew, De Bilt, and Ksara.

Jan. 15d. Readings also at 0h. (Collmberg, College, Mount Wilson, Palomar, Tucson, Pierce Ferry, China Lake, and Hungry Horse), 1h. (College, Reno, Pasadena, Tinemaha, Lick, Palomar, Pierce Ferry, Shasta Dam, China Lake, Hungry Horse, Boulder City, and Overton), 2h. (College (2), San Juan, Pasadena, Tinemaha, Palomar (2), Mount Wilson, Tucson (3), Pierce Ferry (2), Shasta Dam, China Lake (2), Hungry Horse (2), Boulder City, Overton (2), Naryn, and Ili), 3h. (College), 4h. (Overton (2), Pierce Ferry (2), Grozny, and Bombay), 5h. (Tamanrasset, Tacubaya (2), and Hungry Horse), 6h. (College (2) and Pierce Ferry), 7h. (College and near Manila), 9h. (College, Palomar, Mount Wilson, Tucson, Pierce Ferry, Hungry Horse, China Lake, and Overton), 10h. (Tacubaya, Chatra, Askhabad, and near Istanbul), 11h. (Brisbane and near Ashkabad), 13h. (near Stepanavan (2), Akhalkalaki (2) and Gandzha (2)), 14h. (Overton and Wellington), 15h. (Christchurch and Tamanrasset), 16h. (Apia, Collmberg, near Stepanavan, and Akhalkalaki), 17h. (College, Seven Falls, Shawinigan Falls, Pierce Ferry, Hungry Horse, and Tacubaya), 18h. (near Stepanavan and Akhalkalaki), 21h. (Huancayo, Riverside, Palomar, Shasta Dam, Tinemaha, Hungry Horse, Pierce Ferry, China Lake, Tucson, Boulder City, College (2), near Apia, Tamanrasset, Jena, Stuttgart, Collmberg, and near Istanbul), 22h. (Riverside, Lick, Palomar, Pasadena, Shasta Dam (2), Tinemaha (2), Hungry Horse, Pierce Ferry (2), China Lake (2), Tucson (2), Boulder City (2), College (2), Tamanrasset, Besançon (2), Strasbourg (2), Jena, Stuttgart (2), Collmberg (2), Riverview, Brisbane, and Wellington, near Klyuchi).

Jan. 16d. 1h. 11m. 46s. Epicentre 41°·9N. 15°·8E.

Intensity VII at S. Nicandro, M. S. Angelo, Peschici ; VI at Viesta ; V at Foggia, Stornarella, and Zapponeta. Epicentre 42°·0N. 15°·8E. (Rome).

Monthly Bulletin, Rome, Jan., 1951, p.11.

$A = +\cdot7183$, $B = +\cdot2033$, $C = +\cdot6653$; $\delta = -9$; $h = -2$;
$D = +\cdot272$, $E = -\cdot962$; $G = +\cdot640$, $H = +\cdot181$, $K = -\cdot747$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		1·8	142	0 28	− 4	—	—	—	—	—
Rocca di Papa		2·3	266	e 0 43	+ 3	i 1 36	?	i 0 53	P_g	—
Rome		2·5	270	i 0 46	+ 3	i 1 16	+ 2	i 0 56	P_g	—
Messina		3·7	183	e 1 1a	+ 1	i 1 43	− 2	i 1 15	P_g	—
Florence		3·8	301	i 1 6	P*	1 47	0	i 1 19	P_g	—
Prato		4·0	302	i 1 5	+ 1	i 2 14	S_g	—	—	—
Triest		4·0	339	i 1 6	+ 2	i 1 48	− 4	i 1 22	P_g	—
Bologna		4·2	310	e 1 12	P*	i 1 59	+ 2	e 1 32	P_g	e 2·3
Belgrade		4·5	48	e 1 19a	P*	i 2 29	S_g	e 1 28	P_g	—
Salo		5·3	316	i 1 24k	+ 2	i 2 19	− 6	i 2 55	S_g	—
Timisoara	N.	5·5	44	i 1 55	P_g	e 3 15	S_g	—	—	—
Sofia	E.	5·6	79	e 1 29	+ 2	2 26	− 7	i 1 59	P_g	—
Pavia		5·8	307	i 1 32k	+ 3	i 2 34	− 4	—	—	—
Budapest		6·1	22	1 47	P*	e 2 45	0	i 3 4	S*	i 3·6
Ogyalla		6·2	15	e 1 40	+ 5	e 2 46	− 2	e 3 22	S_g	e 3·6
Vienna		6·4	3	e 1 38	0	e 3 16	S*	e 3 27	S_g	—
Chur		6·7	320	e 1 43	+ 1	e 2 54	− 6	—	—	—
Athens		7·2	120	e 1 41	− 8	—	—	i 1 57	P*	—
Ravensburg		7·3	325	e 1 52	+ 2	e 3 40	S*	e 2 34	P_g	—
Zürich		7·5	319	e 1 52k	− 1	e 3 19	− 1	—	—	—
Bucharest		7·9	68	e 1 43	−16	e 3 50	S*	e 2 38	P_g	e 4·6
Skalnate Pleso		7·9	22	e 2 32	P_g	e 3 30	0	e 3 54	S*	—
Basle		8·1	317	e 2 2a	0	e 3 27	− 8	—	—	—
Neuchatel		8·1	312	e 2 1	− 1	e 3 24	−11	—	—	—
Prague		8·2	354	e 2 1	− 2	e 3 41	+ 3	e 4 32	S_g	—
Stuttgart		8·3	328	e 2 3k	− 1	e 3 46	+ 6	e 2 47	P_g	e 5·1
Besançon		8·8	311	e 2 10	− 1	e 3 59	+ 6	e 4 20	S*	—
Karlsruhe		8·8	326	e 2 3	− 8	e 3 55	+ 2	—	—	—
Strasbourg		8·8	322	e 2 12	+ 1	e 3 48	− 5	e 2 48	P_g	—
Jena		9·5	344	e 2 20	0	e 4 16	+ 6	i 5 26	S_g	—
Collmberg	z.	9·6	349	e 2 21	0	e 4 47	S*	e 5 24	S_g	—
Clermont-Ferrand		10·0	297	e 2 26	− 1	—	—	—	—	—
Istanbul		10·0	90	e 2 26	− 1	—	—	—	—	e 6·1
Potsdam		10·6	351	—	—	e 4 44	+ 7	i 5 51	S_g	—
Paris		11·7	311	i 2 51	0	i 4 53	−11	i 2 59	PP	i 6·1

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kew		14·6	316	—	—	—	—	e 7 20	Q	e 10·2
Almeria		15·0	256	3 47	PP	6 27	+ 4	3 59	PPP	11·6
Granada		15·7	259	i 3 53k	+ 9	6 29	−10	—	—	9·4
Upsala		18·0	3	i 4 23	+10	e 7 49	+17	—	—	e 10·1
Rathfarnham Castle		18·7	315	e 2 24	?	—	—	—	—	—
Tamanrasset	z.	20·9	208	e 4 46	0	e 8 34	− 1	—	—	—
Hungry Horse		79·8	329	i 12 13	+ 1	—	—	i 12 22	PcP	—
Overton	z.	89·7	322	e 12 18	−43	—	—	—	—	—
Pierce Ferry		89·8	321	i 13 4	+ 2	—	—	e 12 15	?	—
Boulder City		90·3	322	e 13 6	+ 2	—	—	—	—	—
Tucson		91·4	317	e 13 11	+ 2	—	—	i 13 21	?	—
La Paz		96·4	254	e 13 26	− 6	—	—	17 28	PP	—

Additional readings :—
Rome i = 1m.30s., iS_gE = 1m.37s.
Messina iZ = 1m.6s., iN = 1m.21s., i = 2m.20s.
Florence i = 1m.29s., S_g = 2m.13s.
Triest $iS_gS_gS_g$ = 2m.7s.
Bologna i = 1m.44s.
Belgrade iZ = 1m.40s., iNW = 1m.59s., iS_gZ = 2m.41s.
Salo e = 2m.6s.
Timisoara iPE = 1m.58s., iP*N = 2m.10s., eSE = 3m.18s., eS*N = 3m.44s.?, eS_gN = 4m.4s.
Sofia S_gE = 3m.22s.
Budapest PE = 1m.54s., iE = 2m.33s. and 3m.27s.
Ogyalla eP_g = 1m.56s., e = 2m.18s., eSN = 2m.35s., and 2m.39s., eN = 2m.54s., eS* = 2m.58s., eS_gN = 3m.15s.
Vienna i = 2m.18s.
Ravensburg eZ = 1m.59s. and 2m.2s., e = 2m.42s., eS? = 3m.25s.
Bucharest eN = 2m.49s.
Skalnate Pleso eP? = 2m.39s., e = 2m.46s., eSN = 3m.24s., e = 3m.37s. and 3m.48s., eN = 4m.10s., eS_gE = 4m.26s.
Prague e = 2m.12s., iP* = 2m.19s., e = 2m.30s., iP_g = 2m.44s., i = 3m.15s., eS = 3m.31s., i = 3m.46s., eS* = 3m.56s., i = 4m.13s., e = 4m.18s.
Stuttgart eZ = 2m.16s., 2m.22s., and 2m.36s., eP_gZ = 2m.55s., eZ = 2m.59s., 3m.5s., and 3m.48s., eSZ = 3m.54s., eS = 3m.58s., e = 4m.47s., eZ = 5m.4s.
Besançon ePP = 2m.17s., ePPP = 2m.28s., e = 2m.56s., 3m.24s., and 3m.42s., eSS = 4m.10s.
Karlsruhe eZ = 3m.45s.
Strasbourg ePP = 2m.18s., ePPP = 2m.27s., i = 3m.3s., 3m.12s., 3m.23s., and 4m.6s., eS* = 4m.17s.
Jena eEN = 2m.28s., eN = 2m.42s., eP_gEN = 3m.16s., eN = 3m.39s., eE = 3m.58s., eN = 4m.32s.
Collmberg eSZ = 4m.39s., eZ = 5m.2s., eE = 5m.27s., $eS_g?Z$ = 6m.28s.
Istanbul eZ = 2m.31s., eN = 5m.52s.
Potsdam eSE = 4m.50s., eS*E = 5m.28s., iN = 5m.40s.
Paris iPPP = 3m.6s., e = 3m.39s.?, iSS = 5m.25s.
Long waves were also recorded at Copenhagen.

Jan. 16d. 8h. 8m. 42s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·030.
(as on 1950, Dec. 24d.).

A = +·2683, B = +·7576, C = +·5951 ; δ = +·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.
Khorog	1·2	48	e 0 36	+ 2	i 1 3	+ 3	—	—	—
Kulyab	1·3	335	e 0 33	− 2	—	—	—	—	—
Obi-garm	2·1	342	i 0 41	− 1	i 1 12	− 2	—	—	—
Stalinabad	2·3	323	i 0 42	− 2	i 1 13	− 4	—	—	—
Dzhergetal	2·6	12	i 0 50	+ 3	—	—	—	—	—
Fergana	3·8	15	i 1 4	+ 3	i 1 51	+ 3	—	—	—
Samarkand	4·1	319	i 1 2	− 2	i 1 48	− 6	—	—	—
Andijan	4·3	20	1 10	+ 3	2 2	+ 3	—	—	—
Lunacharskoe	4·7	349	—	—	2 8	0	—	—	—
Tashkent	4·7	349	i 1 13	+ 1	i 2 10	+ 2	—	—	—
Tchimkent	5·6	354	i 1 26	+ 3	i 2 30	+ 2	—	—	—
Naryn	6·4	41	e 1 34	+ 1	e 2 46	0	—	—	—
Frunse	6·9	26	i 1 44	+ 4	i 3 4	+ 6	—	—	—
Mary	6·9	280	1 35	− 5	2 49	− 9	—	—	—
Rybach'e	7·2	35	i 1 47	+ 3	i 3 11	+ 6	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Krasnogorka		7·5	27	i 1 48	+ 1	—	—	—	—	—
Almata		8·2	35	i 2 1	+ 4	3 35	+ 7	—	—	—
Kurmenty		8·7	41	2 6	+ 3	—	—	—	—	—
Ili		8·8	33	2 7	+ 3	—	—	—	—	—
Dehra Dun	N.	9·0	143	e 4 24	?	—	—	—	—	—
Chilisk		9·1	39	2 13	+ 5	—	—	—	—	—
Ashkabad		9·8	281	—	—	3 55	−10	—	—	—
New Delhi		9·8	143	i 2 17	0	i 4 0	− 5	4 25	SS	4·3
Chatra		17·2	120	e 3 50	+ 2	i 6 54	+ 4	4 2	PP	—
Bombay		17·8	172	e 3 52	− 2	e 7 12	+ 9	—	—	—
Poona		18·3	170	i 3 58	− 2	7 17	+ 5	4 20	PPP	—
Hyderabad	N.	20·4	158	e 4 20	− 1	e 8 1	+ 9	—	—	—
Tiflis		20·5	293	4 31	+ 9	8 16?	+23	—	—	—
Stuttgart	Z.	45·5	306	e 7 58	− 1	—	—	e 9 32	PcP	—
Tamanrasset	Z.	57·1	277	e 9 25	0	—	—	e 10 22	pP	—
Pretoria	Z.	73·8	220	i 11 23	PcP	—	—	—	—	—
College		74·4	17	e 11 15	0	—	—	—	—	—
Pietermaritzburg	Z.	76·0	216	i 11 23	− 1	—	—	—	—	—
Hungry Horse		95·2	4	i 13 0	+ 1	—	—	—	—	—
Overton	Z.	107·0	4	i 18 28	PP	—	—	—	—	—
Pierce Ferry		107·4	4	e 17 46	[−13]	—	—	—	—	—
Tucson		111·4	2	e 18 42	PP	—	—	—	—	—

Additional readings :—
New Delhi QEN =3m.50s., SSE =4m.11s., S*E =4m.31s.
Chatra PPPEN =4m.11s., SSEN =7m.11s., SSS =7m.25s.
Poona SSE =7m.41s., ScPE =9m.33s.
Tucson e =18m.51s.

Jan. 16d. 12h. 36m. 9s. Epicentre 38°·8N. 20°·6E. (as on 9d.).

Intensity IV at Asprogherakas (Isle of Cephalonia). Epicentre 38°·2N. 21°·0E.

A. Galanopoulos.
Seismo. Institute Bulletin, Athens, 1952, p.12.

A = +·7314, B = +·2749, C = +·6240 ; δ = −11 ; h = −1 ;

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		2·6	109	0 42	− 2	e 1 18	+ 1	—	—	—
Messina	Z.	4·0	263	e 1 13	P*	i 1 39	−13	—	—	—
Sofia		4·4	27	e 1 13	+ 3	2 49	L	—	—	(2·8)
Belgrade		6·0	359	e 2 13	P_g	e 3 30	S_g	—	—	—
Istanbul		6·9	68	e 1 51?	+ 6	e 3 55	S_g	—	—	—
Bucharest		7·0	35	e 1 45	− 1	e 3 29	S*	e 3 47	S_g	—
Timisoara		7·0	4	(e 1 36?)	−10	(e 3 31)	S*	(e 3 57)	S_g	—
Kalossa		7·8	353	3 29	S	(3 29)	+ 1	e 3 54	S*	e 5·1
Triest		8·5	326	e 2 9	+ 2	e 3 44	− 1	i 5 11	Q	i 5·5
Budapest		8·8	353	5 17	?	—	—	e 5 22	Q	6·2
Bologna		9·0	312	e 2 43	P*	e 4 6	+ 8	—	—	—
Ogyalla	N.	9·2	350	—	—	e 4 20	+17	—	—	—
Salo	Z.	10·1	315	e 2 35	+ 6	e 4 19	− 6	—	—	—
Skalnate Pleso		10·4	359	e 2 35	+ 1	e 5 18	S*	e 5 43	S_g	6·0
Prague		12·1	341	i 3 1	+ 4	e 5 29	+15	e 5 51?	Q	e 6·8
Zürich		12·3	316	e 3 4	+ 5	e 5 17	− 1	—	—	—
Basle		12·9	317	e 3 9	+ 2	e 5 31	− 2	—	—	—
Stuttgart		12·9	324	e 3 5	− 2	e 5 27	− 6	e 3 15	PP	e 8·0
Strasbourg		13·5	321	e 3 15	0	e 6 3	SS	e 3 25	PP	e 6·9
Besançon		13·6	313	i 3 23	+ 6	e 5 54	+ 4	e 3 35	PPP	e 6·9
Collmberg	Z.	13·6	339	e 3 18	+ 1	—	—	e 8 38	PcP	—
Jena	E.	13·7	335	e 3 17	− 1	e 6 21?	SSS	—	—	—
Paris		16·4	313	e 3 54	+ 1	—	—	i 4 5	PP	e 8·8
Tamanrasset	Z.	20·5	223	e 4 31	−11	e 8 27	0	—	—	e 9·6
College		76·3	356	e 11 49	− 3	—	—	e 12 9	PcP	—
Hungry Horse		84·3	332	i 12 31	− 4	—	—	e 12 43	pP	—

For Notes see next page.

NOTES TO JANUARY 16d. 12h. 36m. 9s.

Additional readings and note :—
Belgrade eP_gS_gNE =3m.53s., iS_gNW =4m.2s.
Bucharest eE =1m.49s., eN =2m.54s.
Timisoara eN =(1m.40s.?), eE =(3m.35s.?), readings increased by 4 minutes.
Skalnate Pleso e =2m.57s.
Prague e =4m.46s.
Stuttgart eS? =6m.7s., eS?Z =6m.16s., eZ =7m.43s.
Collmberg ePPZ =3m.26s.
Paris i =3m.58s., iPPP =4m.14s., e =5m.47s.
Tamanrasset ePPZ =4m.53s., eSSZ =8m.35s.
Long waves were also recorded at De Bilt, Granada, and Upsala.

Jan. 16d. 13h. 13m. 58s. Epicentre 18°·9S. 172°·0E.
A = −·9375, B = +·1318, C = −·3220 ; δ = −4 ; h = +5 ;
D = +·139, E = +·990 ; G = +·319, H = −·045, K = −·947.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		16·4	74	e 3 51	− 2	e 6 22?	−34	—	—	—
Auckland	N.	18·1	172	(i 4 14)	0	i 4 14	P	—	—	—
Brisbane		19·4	240	i 4 30a	0	e 8 8	+ 4	e 4 33	P	—
Wellington		22·4	174	4 48	− 4	i 9 4	0	i 9 37	SS	11·5
Riverview		23·8	226	i 5 18a	+ 3	e 9 27	− 1	i 5 49	PP	e 11·1
Christchurch		24·6	178	5 28	+ 5	e 9 42	0	—	—	e 12·0
Lick	Z.	83·8	47	e 12 32	0	—	—	e 12 36	P	—
Fresno		84·8	48	e 12 38k	+ 1	—	—	—	—	—
Pasadena	Z.	84·8	52	i 12 37	0	—	—	—	—	—
Shasta Dam		85·0	44	i 12 37	− 1	—	—	—	—	—
Mineral	Z.	85·3	45	i 12 40k	0	—	—	i 13 6	?	—
Riverside	Z.	85·3	52	e 12 40	0	—	—	—	—	—
Palomar	Z.	85·4	53	e 12 41	+ 1	—	—	—	—	—
China Lake	Z.	86·0	50	i 12 43	0	—	—	—	—	—
Reno	Z.	86·1	46	e 12 46k	+ 2	—	—	—	—	—
Tinemaha	Z.	86·1	49	e 12 44	0	—	—	—	—	—
Boulder City		88·0	51	e 12 54	+ 1	—	—	—	—	—
Overton	Z.	88·6	50	i 12 57	+ 1	—	—	—	—	—
Pierce Ferry		88·7	51	i 12 57	0	—	—	—	—	—
Tucson		89·6	56	e 13 2	+ 1	—	—	—	—	—
Collmberg	Z.	143·7	337	e 19 35	[− 2]	—	—	—	—	—
Jena	E.	144·5	338	e 19 37	[− 1]	—	—	—	—	—
Rathfarnham Castle		145·6	358	i 19 43	[+ 3]	i 23 32	PKS	—	—	—
Stuttgart	Z.	147·1	339	e 19 43	[0]	—	—	i 19 46	PKP_2	—
Strasbourg		147·8	340	e 19 49a	[+ 5]	—	—	e 19 56	PKP_2	—
Zürich		148·5	339	e 19 48	[+ 3]	—	—	—	—	—
Basle		148·7	339	e 19 50	[+ 5]	—	—	—	—	—
Paris		149·0	347	e 19 47	[+ 1]	—	—	i 19 51	PKP_2	e 74·0
Besançon		149·5	341	i 19 52	[+ 5]	—	—	e 20 0	PKP_2	—
Tamanrasset	Z.	166·8	289	e 20 11	[+ 4]	—	—	e 21 15	PKP_2	—

Additional readings :—
Wellington ePP =6m.32s.
Riverview iE =9m.34s., iN =9m.37s., iEN =9m.45s., iN =9m.55s.
Reno eN =13m.16s., eE =13m.42s., eN =14m.26s.
Paris e =21m.8s.
Tamanrasset eZ =24m.25s., ePPZ =25m.8s.

Jan. 16d. 17h. 53m. 50s. Epicentre 39°·2N. 49°·5E.

A = +·5046, B = +·5909, C = +·6295; δ = +5; h = −1;
D = +·760, E = −·649; G = +·409, H = +·479, K = −·777.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lenkoran		0·7	231	0 12	P_g	—	—	—	—	—
Baku		1·2	14	i 0 35	S	(i 0 35)	− 6	—	—	—
Kirovobad		2·9	303	i 0 48	0	—	—	—	—	—
Erevan		4·0	286	e 1 8	+ 4	2 2	S*	—	—	—
Tiflis		4·4	306	e 1 10	0	—	—	—	—	—
Leninakan		4·6	292	—	—	2 28	S_g	—	—	—
Kizyl-Arvat		5·3	90	1 25	+ 3	2 22	− 3	—	—	—
Abastumanj		5·7	299	1 29	+ 1	—	—	—	—	—
Zugdidi		6·6	302	1 44	+ 3	e 3 37?	S_g	—	—	—
Ashkabad		7·0	97	i 1 45	− 1	i 3 3	− 5	—	—	—
Sotchi		8·6	304	e 2 5	− 4	—	—	—	—	—
Mary		9·8	96	i 2 23	− 1	4 8	− 9	—	—	—
Samarkand		13·5	83	e 3 12	− 3	e 5 40	− 7	—	—	—
Stalinabad		15·0	86	i 3 36	+ 1	i 6 17	− 6	—	—	—
Tashkent		15·2	76	e 3 40	+ 2	i 6 35	+ 7	—	—	—
Tchimkent		15·5	72	i 3 41	− 1	—	—	—	—	—
Istanbul	z.	15·7	283	e 3 46	+ 2	—	—	—	—	—
Obi-garm		15·7	86	i 3 41	− 3	e 6 31	− 8	—	—	—
Kulyab		15·9	88	e 3 54?	+ 7	e 6 38?	− 6	—	—	—
Dzhergetal		16·8	83	i 3 59	+ 1	—	—	—	—	—
Khorog		17·4	88	e 4 6	0	—	—	—	—	—
Andijan		17·6	77	4 8	0	—	—	—	—	—
Helwan		17·6	243	e 3 54	−14	e 7 14	− 9	—	—	e 9·7
Moscow		18·4	338	e 4 18	0	e 7 48?	+ 7	—	—	—
Sverdlovsk		19·1	17	e 4 28?	+ 1	e 7 53?	− 4	—	—	—
Naryn		20·3	73	e 4 40	0	e 8 24	+ 1	—	—	—
Ili		21·1	65	i 4 49	+ 1	—	—	—	—	—
Prague		27·0	305	e 6 20	PP	—	—	e 6 44	PPP	—
Collmberg	z.	28·1	307	e 5 53	− 2	—	—	—	—	—
Stuttgart	z.	30·2	302	e 6 18	+ 4	—	—	—	—	—
Tamanrasset	z.	40·7	259	e 7 43	− 1	—	—	i 7 57	?	—
Pretoria	z.	67·6	200	i 11 5	+ 4	—	—	—	—	—
College		75·4	8	e 11 43	− 4	—	—	e 11 59	pP	—

Prague gives also e = 6m.53s. and 8m.0s.

Jan. 16d. 22h. 37m. 33s. Epicentre 20°·5S. 174°·0E. (as on 1948, Jan. 10d.).

A = −·9323, B = +·0980, C = −·3481; δ = −4; h = +5;
D = +·105, E = +·995; G = +·346, H = −·036, K = −·937.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	16·3	178	i 3 50	− 2	—	—	—	—	10·0
Brisbane		20·4	246	i 4 39k	− 2	i 8 37	+12	i 5 6	PP	—
Wellington		20·7	180	i 4 38	− 6	i 8 34	+ 3	e 5 7	PP	10·4
Christchurch		23·0	183	—	—	9 9	− 5	e 9 47	SS	e 11·4
Riverview		24·2	232	i 5 18a	− 1	e 9 31	− 4	i 10 28	SS	e 11·2
Riverside	z.	84·8	51	e 12 40	+ 3	—	—	—	—	—
China Lake	z.	85·5	50	e 12 43	+ 2	—	—	—	—	—
Reno	z.	85·9	46	e 12 49	+ 6	—	—	—	—	—
College		90·0	15	e 13 1	− 2	—	—	—	—	—
Collmberg	z.	145·8	339	e 19 43	[+ 2]	—	—	—	—	—
Stuttgart	z.	149·3	340	e 19 54	[+ 8]	—	—	—	—	—
Strasbourg		149·9	341	e 20 10	PKP_a	—	—	—	—	—
Granada		163·2	353	—	—	(27 3)	[− 4]	—	—	27·0

Riverview also gives iZ = 6m.39s., iN = 9m.41s., iE = 9m.46s., iSSSN = 10m.42s.
Long waves were also recorded at Berkeley and Paris.

Jan. 16d. 23h. 21m. 2s. Epicentre 39°·2N. 141°·9E. Depth of focus 0·010. (as on 1940, November 19d.).

Intensity V at Senmaya (Iwate Pref.); IV at Sakari, Yahagi (Iwate Pref.), Kawatabi, and Onagawa (Miyagi Pref.); and II-III at Isinomaki, Mizusawa, Morioka, Miyako, Watari (Miyagi Pref.), Tome, Yonesato, and Itinoseki (Iwate Pref.). Macroseismic raidus between 100 and 200km.
Epicentre 39°·2N. 141°·8E. Depth of focus 60km.

Seismological Bulletin of the Central Met. Obs., Japan, for January, 1951, Tokyo, 1951, pp. 13-14, with macroseismic chart.

$A = -·6115$, $B = +·4795$, $C = +·6295$; $\delta = +12$; $h = -1$;
$D = +·617$, $E = +·787$; $G = -·495$, $H = +·388$, $K = -·777$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Miyako		0·4	8	0 18	+ 3	0 26	− 1
Mizusawa		0·6	264	0 15	− 2	0 24	− 5
Morioka		0·8	311	0 17k	− 1	0 27	− 5
Sendai		1·1	220	0 20a	− 2	0 34	− 4
Hatinohe		1·4	348	0 27	+ 2	0 43	− 1
Akita		1·5	289	0 26	− 1	0 42	− 5
Yamagata		1·5	232	0 48	S	(0 48)	+ 1
Hukusima		1·9	218	0 31	− 1	0 49	− 6
Onahama		2·4	199	1 3	S	(1 3)	− 4
Mito		3·0	202	0 58	+11	1 35	+13
Urakawa		3·1	13	0 24	−24	—	—
Utunomiya		3·1	211	0 50	+ 2	1 25	+ 1
Tukubasan		3·3	205	0 59	+ 8	1 27	− 2
Maebasi		3·6	220	1 37	S	(1 37)	0
Kumagaya		3·6	214	0 58	+ 3	1 38	+ 1
Tokyo		3·9	207	0 57	− 2	—	—
Hunatu		4·4	208	1 46	+40	2 22	+26
Osima		4·8	205	2 8	S	(2 8)	+ 2
Overton	z.	77·0	53	—	—	e 29 28	SSS

Jan. 16d. Readings also at 1h. (La Paz, near Kurmenty, and Chilisk), 2h. (Tacubaya, near Akhalkalaki, and Stepanavan), 3h. (Merida, Puebla, Tacubaya, Vera Cruz, Tiflis (3), Abastumanj, Gandzha, Zugdidi, near Akhalkalaki (3), Stepanavan (3), Tsikhlis-Dzhvari, and near Dzhergetal), 4h. (Chatra, Stalinabad, Andijan, near Khorog, Kulyab, Obi-garm, Dzhergetal, and Fergana), 5h. (College), 6h. (Tacubaya, College (2), Overton (2), and Pierce Ferry (2)), 9h. (near Istanbul), 11h. (College, Overton, Pierce Ferry, Tamanrasset, Auckland, Christchurch, Wellington, near Apia (2), and near Manila), 12h. (Chatra), 13h. (near Taranto), 14h. (near Istanbul and near Apia), 15h. (Christchurch, Ashkabad, near Gandzha, Akhalkalaki, Tsikhlis-Dzhvari, near Abastumanj, Tiflis, Zugdidi, and near La Paz), 16h. (Wellington, Overton, Pierce Ferry, Apia, Prague, near Huancayo, and near Almeria), 18h. (near Alicante), 19h. (College, Overton, Pierce Ferry, Tucson, near Apia, and near Almeria), 20h. (College and Hungry Horse), 21h. (Nanking, Auckland, Wellington, College, Hungry Horse, and Overton), 22h. (Hungry Horse and near College), 23h. (Apia, near Mary, Ashkabad, and Kizyl-Arvat).

Jan. 17d. Readings at 0h. (Riverview, China Lake, Collmberg, Stuttgart, Istanbul, Tamanrasset, Leninakan, Lenkoran, Maklach-Kala, Sotchi, near Abastumanj (2), Akhalkalaki (2), Gandzha (3), Grozny, Kirovobad, Piatigorsk, Stepanavan (3), Tiflis (2), Tsikhlis-Dzhvari (3), Yalta (2), and Zugdidi (2)), 1h. (Brisbane, Christchurch, Kaimata, Wellington, China Lake, Riverside, College, Stuttgart, near Akhalkalaki (4), Gandzha (4), Stepanavan (4), Tsikhils-Dzhvari (4), and near Tananarive), 2h. (Overton), 3h. (College, Khorog, near Dzhergetal, Kulyab, near Ashkabad, and near Mizusawa), 4h. (Tucson and near Chatra), 5h. (Tamanrasset), 6h. (Lick and Mineral), 7h. (Zugdidi, near Abastumanj, Akhalkalaki, Leninakan, Gandzha, Stepanavan, Tiflis, and Tsikhlis-Dzhvari), 8h. (Apia, Pierce Ferry, and College), 9h. (Wellington), 10h. (College, Tamanrasset (3), and near Manila), 11h. (College and Istanbul), 12h (College and Shasta Dam), 13h. (Boulder City, Shasta Dam, Hungry Horse, and College), 15h. (Bogota, La Paz, near Huancayo, near Akhalkalaki (2), Gandzha (2), Stepanavan, Tsikhlis-Dzhvari (2), near Malaga, and Granada) 16h. (Apia, Riverview, Auckland (2), Brisbane, near Christchurch (2), Kaimata (2), New Plymouth, Wellington (2), Palomar, Riverside, China Lake (3), Tinemaha (2), Tucson (2), Boulder City, Overton (3), Pierce Ferry (3), Hungry Horse, College (2), Huancayo, La Paz, Tamanrasset (2), Ksara, Collmberg, Stuttgart, San Juan, near Balboa Heights, and near Tacubaya), 17h. (Riverview, Brisbane, Tuai, College, Collmberg, Stuttgart, Alicante, Granada, and Tamanrasset), 18h. (Granada, and near Apia), 19h. (Brisbane, Djakarta, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Pierce Ferry, Lick, Mineral, Shasta Dam, Hungry Horse, College (2), and Tamanrasset), 20h. (Collmberg, Palomar, Riverside, China Lake, Tucson, Puebla, Tacubaya, near Merida, and near Obi-garm), 21h. (Andijan and Stuttgart (2)), 23h. (Collmberg, Stuttgart, Hungry Horse, Lwow, Bucharest, Sofia, Timisoara, near Belgrade, Budapest, Istanbul, Kishinev, and Yalta).

Jan. 18d. 21h. 15m. 45s. Epicentre 52°·1N. 177°·5W. (as on 1950, August 13d.).

$A = -·6162$, $B = -·0269$, $C = +·7871$; $\delta = -5$; $h = -6$;
$D = -·044$, $E = +·999$; $G = -·786$, $H = -·034$, $K = -·617$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Adak		0·6	113	i 0 19	+ 4	i 0 29	+ 3	—	—	—
Klyuchi		13·4	297	e 3 24	+10	e 4 26	?	—	—	—
College		19·9	37	e 4 38	+ 2	i 7 40	−35	e 8 47	PcP	e 10·2
Victoria		34·1	74	i 6 48k	0	i 12 17	+ 3	—	—	15·0
Vladivostok		34·6	276	i 6 51	− 2	i 12 18	− 4	—	—	—
Seattle		35·1	74	i 7 0a	+ 3	e 12 34	+ 4	i 7 10	pP	—
Resolute Bay		38·7	25	7 2	−25	13 6	−19	8 37	PP	—
Shasta Dam		38·8	84	i 7 28	0	—	—	—	—	—
Ukiah		39·2	87	e 7 44	+13	e 13 28	− 4	e 8 58	PP	e 16·5
Mineral	z.	39·5	84	i 7 34a	0	—	—	i 9 55	PcP	—
Hungry Horse		39·6	69	i 7 36	+ 1	i 13 25	−13	i 9 41	PcP	—
Berkeley		40·6	88	i 7 42	− 1	i 13 57	+ 3	e 17 9	Q	e 19·0
Reno		41·1	84	e 7 47a	0	e 13 57	− 4	—	—	—
Santa Clara		41·1	88	e 15 31	?	e 18 52	?	—	—	e 21·0
Lick		41·3	88	e 7 47a	− 2	e 10 9	PcP	e 9 34	PP	—
Butte		41·7	71	e 7 54	+ 2	e 14 18	+ 8	—	—	e 20·7
Saskatoon		41·9	61	—	—	i 17 54	SS	—	—	23·2
Bozeman		42·8	71	e 8 2	+ 1	i 14 22	− 4	e 14 40	sS	e 17·8
Fresno		42·8	87	e 8 1a	0	e 14 26	0	e 9 9	PP	—
Tinemaha	z.	43·6	86	i 8 8a	0	—	—	—	—	—
Logan		44·6	76	i 8 15	− 1	i 14 53	+ 1	e 9 40	PP	i 18·2
China Lake	z.	44·8	87	i 8 16a	− 1	—	—	i 8 30	pP	—
Salt Lake City		45·2	77	e 8 19	− 1	i 14 58	− 3	—	—	e 18·5
Pasadena		45·5	88	i 8 21	− 2	e 14 58	− 7	i 8 36	pP	e 18·4
Irkutsk		45·7	304	8 25	+ 1	18 33	SS	e 10 0	PcP	—
Riverside	z.	46·1	88	i 8 26	− 2	—	—	i 8 39	pP	—
Overton	z.	46·2	83	i 8 29	+ 1	—	—	—	—	—
Boulder City		46·4	84	i 8 30	0	—	—	i 9 5	pP	—
Pierce Ferry		46·8	83	i 8 33	0	e 15 21	− 3	—	—	—
Palomar		46·9	88	i 8 32a	− 2	i 15 21	− 4	—	—	—
Rapid City	E.	48·2	69	i 8 46	+ 2	i 15 43	0	e 9 27	sP	e 19·8
Nanking		49·6	273	i 8 54a	− 1	15 59	− 3	10 13	PcP	—
Tucson		51·3	85	i 9 7	− 1	e 16 26	0	e 9 20	pP	e 23·8
Chicago		58·4	62	—	—	e 17 52	−10	c 18 15	sS	e 24·4
Florissant		59·0	66	i 9 58	− 6	e 18 6	− 4	—	—	—
St. Louis		59·2	66	i 10 4	− 1	e 18 4	− 8	—	—	—
Sverdlovsk		61·4	328	i 10 20	0	18 43	+ 3	—	—	—
Cleveland		61·9	58	i 10 23a	− 1	i 18 43	− 4	—	—	—
Ottawa		62·0	51	e 10 23a	− 1	e 18 42	− 6	e 11 2	PP	e 31·6
Buffalo		62·2	55	i 10 24	− 2	e 18 47	− 4	—	—	—
Seven Falls	E.	63·0	47	10 34	+ 3	19 2	+ 1	26 1	SSS	31·2
Pennsylvania		64·3	56	i 10 31	− 8	i 18 42	−35	c 19 28	sS	—
Kurmenty		64·9	309	e 10 43	0	—	—	—	—	—
Almata		65·4	310	e 10 46	− 1	—	—	—	—	—
Harvard		66·1	51	e 10 51	0	—	—	—	—	e 34·4
Palisades		66·1	53	i 10 51	0	e 19 38	− 1	i 11 21	PcP	e 34·0
Washington	z.	66·1	57	e 10 53	+ 2	—	—	—	—	—
Fordham		66·3	53	e 10 52	0	e 19 43	+ 1	e 20 21	PPS	32·4
Philadelphia		66·3	55	—	—	e 20 1	+19	—	—	e 31·5
Weston		66·3	51	e 10 51	− 1	—	—	—	—	e 30·6
Rybach'e		66·4	310	i 10 54	+ 1	—	—	—	—	—
Frunse		66·8	311	i 10 56	0	—	—	—	—	—
Naryn		67·2	309	i 10 58	0	—	—	—	—	—
Columbia		67·6	63	e 11 1	0	e 19 55	− 2	e 24 27	SS	e 32·5
Upsala		67·7	353	e 17 44	?	e 20 15?	+17	—	—	e 37·2
Tacubaya		67·8	87	i 11 11	+ 9	—	—	—	—	—
Moscow		68·7	340	e 11 8	+ 1	—	—	—	—	—
Andijan		69·5	311	11 12	0	e 20 20	0	—	—	—
Tchimkent		69·5	313	i 11 12	0	—	—	—	—	—
Fergana		70·0	311	i 11 15	0	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lunacharskoe		70·5	313	e 11 19	+ 1	—	—	—	—	—
Tashkent		70·5	313	i 11 14	− 4	e 20 52	PS	e 13 51	PP	—
Copenhagen		72·3	355	i 11 30	+ 1	21 3	+11	—	—	35·8
Obi-garm		72·4	311	i 11 29	− 1	e 22 52	?	—	—	—
Samarkand		72·8	314	e 11 31	− 1	—	—	—	—	—
Stalinabad		72·9	312	i 11 32	− 1	e 20 55	− 4	—	—	—
Kulyab		73·0	310	e 11 33	0	e 20 59	− 1	—	—	—
Rathfarnham Castle		74·7	6	e 11 45?	+ 2	e 21 31	+12	—	—	e 35·2
Collmberg	Z.	76·6	353	e 11 55	+ 1	—	—	e 14 0	PP	—
Kew		76·8	2	—	—	e 22 36	+54	e 39 57	L	e 44·2
Mary		76·8	315	i 11 56	+ 1	—	—	—	—	—
Jena	N.	77·1	354	e 11 57	0	—	—	—	—	—
Bermuda		77·5	53	—	—	e 21 45	− 5	e 39 46	L	e 40·5
Prague		77·7	353	e 12 35	+35	e 22 1	+ 9	e 15 36	PP	e 38·2
Grozny		77·9	329	12 5	+ 4	—	—	—	—	—
Kizyl-Arvat		77·9	321	i 12 1	0	—	—	—	—	—
Ashkabad		78·0	318	i 12 3	+ 1	—	—	—	—	—
Kishinev		78·7	343	i 12 6	0	—	—	—	—	—
Stuttgart		79·3	356	e 12 9a	0	e 22 15	+ 6	e 32 3	SSS	e 39·8
Strasbourg		79·6	357	e 12 13	+ 3	e 21 51	−21	—	—	e 36·2
Gori		79·6	331	12 15	+ 5	e 22 17	+ 5	—	—	—
Tiflis		79·6	330	12 13	+ 3	22 15	+ 3	—	—	—
Zugdidi		79·8	332	e 12 19?	+ 7	—	—	—	—	—
Paris		80·0	0	i 12 12	− 1	e 22 8	− 9	12 27	pP	e 39·2
Yalta		80·0	338	e 12 13	0	e 22 16	− 1	—	—	—
Basle		80·6	357	e 12 7	− 9	—	—	—	—	—
Zürich		80·8	357	e 12 17a	0	—	—	—	—	—
Leninakan		80·8	330	e 12 23	+ 6	—	—	—	—	—
Lenkoran		80·9	325	12 19	+ 2	—	—	15 19	PP	—
Besançon		81·0	358	e 12 18	0	—	—	e 14 22	PP	—
Belgrade		82·2	347	i 12 20a	− 4	e 22 58	+19	e 15 50	PP	e 48·6
Brisbane		83·4	206	i 12 26	− 4	e 22 43	− 8	—	—	—
Istanbul		84·4	340	—	—	e 23 5	+ 4	—	—	e 45·2
Hyderabad	N.	84·8	292	12 34	− 3	22 58	− 7	23 21	ScS	—
Rome		86·0	353	e 12 44	+ 1	e 23 2	[− 5]	i 24 28	PS	—
Djakarta		86·1	255	i 12 40	− 4	e 23 12	[+ 4]	—	—	—
Poona		86·5	296	i 12 45	− 1	e 23 30	+ 8	14 12	PP	—
Bombay		86·8	297	e 12 45	− 2	e 23 27	+ 2	—	—	—
Taranto		86·9	350	e 20 45	?	e 24 5	PS	—	—	—
San Juan		88·1	62	i 12 53	− 1	e 23 11	[−10]	e 23 39	sS	e 46·2
Ksara		89·6	333	i 13 0a	− 1	25 17	PS	—	—	—
Alicante		89·8	2	12 29	−33	23 32	[0]	—	—	e 45·0
Granada		90·9	6	i 13 6a	− 1	—	—	—	—	48·3
Kodaikanal	E.	91·1	289	—	—	e 23 25	[−14]	—	—	—
Bogota		94·6	77	e 14 54	?	e 30 15	SS	—	—	e 47·2
Helwan	Z.	94·6	335	e 13 23	− 1	e 22 41	?	e 17 30	PP	—
Tamanrasset	Z.	105·4	357	17 6	PP	29 38	PPS	e 18 22	PKP	50·2
La Paz		114·7	85	e 18 49	[+ 7]	i 25 31	[0]	i 29 27	PS	55·6
La Plata	N.	134·3	93	31 57	SKSP	33 39	PPS	43 3	SSS	62·6
Pretoria	Z.	147·3	313	i 19 42	[− 1]	—	—	—	—	—
Pietermaritzburg	Z.	149·5	307	i 19 51	[+ 4]	—	—	—	—	—

Additional readings :—
College iP = 4m.41s., eScP = 12m.21s., eScS = 16m.5s.
Victoria iZ = 7m.6s., i = 9m.23s.
Seattle ePP = 8m.18s., ePPP = 8m.43s., and other i readings.
Resolute Bay PPPZ = 9m.4s., e = 13m.45s., SS = 15m.45s.
Mineral iZ = 7m.53s.
Hungry Horse iScS = 17m.40s.
Reno eE = 8m.53s.
Fresno e = 10m.7s.
Logan e = 9m.22s.
China Lake iZ = 8m.37s.
Pasadena iZ = 8m.42s.
Irkutsk PP = 10m.17s.
Rapid City ePPE = 10m.23s., epPPE = 11m.4s., esSE = 15m.57s., eScSE = 18m.32s.
Nanking iZ = 9m.15s., PPZ = 10m.51s., iEN = 18m.59s.
Tucson esPP = 11m.35s., e = 17m.35s.

Continued on next page.

St. Louis iS = 18m.8s.
Cleveland eE = 20m.9s.
Ottawa iZ = 10m.26s., eSSS = 25m.45s.
Pennsylvania iEZ = 10m.39s., iN = 11m.11s., iEN = 20m.26s., eSSE = 23m.17s., esSSE = 23m.20s., iSSSE = 26m.22s.
Tashkent iPPP = 15m.38s., eScS = 21m.20s.
Jena eE = 12m.32s., eN = 12m.37s.
Stuttgart epP?Z = 12m.40s.
Strasbourg e = 12m.26s., i = 12m.41s.
Paris i = 13m.5s. and 13m.14s., eScS = 22m.33s., iSP = 22m.51s.
Besançon e = 13m.7s. and 13m.38s.
Rome iN = 24m.44s., iSSN = 29m.18s.
Poona PPPE = 16m.10s., SKSE = 23m.6s., SKKSE = 23m.15s., PSE = 24m.28s., PPSE = 25m.2s.
San Juan e = 22m.39s., esS = 23m.53s., e = 27m.49s.
Tamanrasset ePPPZ = 21m.23s.
La Paz iPPZ = 19m.59s., iSS = 35m.31s.
La Plata QN = 56m.21s.
Long waves were also recorded at Fort de France, Ivigtut, and other European and New Zealand stations.

Jan. 18d. Readings also at 0h. (Rome and near Lenkoran), 1h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, Sverdlovsk, and Collmberg), 2h. (near Balboa Heights), 3h. (Apia), 4h. (College, Bombay, Dzhergetal, Samarkand, near Andijan, Khorog, Kulyab, and Obi-garm), 5h. (Mount Wilson, Riverside, China Lake, Tinemaha, Tucson, Overton, Pierce Ferry, College, and Klyuchi), 6h. (Tucson, Hungry Horse, College, Stuttgart, Ksara, and near Apia), 7h. (near Basle, Chur, Zürich, Ravensburg, Strasbourg, and Stuttgart), 8h. (Andijan, Dzhergetal, Fergana, Kulyab, Samarkand, Stalinabad, near Khorog, and Obi-garm), 10h. (Klyuchi, Hungry Horse, College, Puebla (2), and near Tacubaya (2)), 11h. (Alicante (3), Tucson, Overton, Pierce Ferry, College, Ksara, and near Chatra), 12h. (Overton and College), 13h. (Merida, Puebla, Tacubaya, and Pierce Ferry), 14h. (Tucson, College, Sofia, near Chatra, near Ashkabad, near Klyuchi, and near Balboa Heights), 15h. (Hungry Horse, College, Fergana, Kulyab, Lunacharskoe, Rybach'e, Tashkent, near Khorog, Obi-garm, and Stalinabad), 16h. (Puebla, Vera Cruz, near Tacubaya, near Klyuchi, and near Ottawa), 17h. (Stuttgart (2), Hungry Horse, and College), 18h. (Chatra and Hungry Horse), 19h. (Tamanrasset, near Algiers Univ., and near Klyuchi), 20h. (near Akhalkalaki, Gandzha, Lenkoran, and Stepanavan), 21h. (Klyuchi), 22h. (College, Harvard, Naryn, near Akhalkalaki, Gandzha, Stepanavan, Tsikhlis-Dzhvari, and near Istanbul).

Jan. 19d. 1h. 40m. 57s. Epicentre 13°·0N. 87°·8W. Depth of focus 0·015.
(as on 1948, Oct. 21d.).

Pasadena gives depth 100km.

A = +·0374, B = −·9740, C = +·2235; δ = +3; h = +6;
D = −·999, E = −·038; G = +·009, H = −·223, K = −·975.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida		8·1	348	e 1 55	− 1	i 3 32	+ 5	—	—	—
Balboa Heights		9·0	115	e 2 8	0	—	—	—	—	—
Tacubaya		12·6	302	e 3 10	+14	e 6 1	+47	—	—	—
Chinchina		14·4	122	—	—	e 5 19	−37	—	—	—
Miami		14·7	28	i 3 31	+ 8	e 5 47	−15	—	—	—
Bogota		15·9	120	e 3 52	+14	e 6 48	+18	e 4 6	PP	—
San Juan		21·5	74	i 4 42	+ 2	—	—	i 5 7	pP	e 8·8
Columbia		21·8	15	e 4 46	+ 3	e 8 49	+19	—	—	e 8·9
Lubbock		24·2	332	5 4	− 2	—	—	—	—	—
St. Louis		25·6	4	e 5 18	− 1	e 9 43	+ 8	e 6 5	PP	e 12·5
Florissant		25·8	4	e 5 20	− 1	—	—	e 10 47	SS	—
Fort de France		25·9	84	e 2 47	?	—	—	—	—	—
Washington	z.	27·5	19	e 5 40	+ 4	—	—	e 6 17	pP	—
Huancayo		27·8	155	e 5 40	+ 1	e 10 24	+13	—	—	e 14·5
Tucson		28·5	317	e 5 44	− 1	e 8 54	PcP	i 6 13	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Palisades		30·4	22	i 6 3	+ 1	—	—	—	—	—
Harvard		32·6	23	i 6 23	+ 2	—	—	—	—	e 16·9
Weston		32·6	23	i 6 22	+ 1	—	—	—	—	e 16·0
Pierce Ferry		32·9	318	i 6 24	0	—	—	—	—	—
Palomar	z.	33·3	313	i 6 26	− 1	i 12 47	ScP	i 9 7	PcP	—
Boulder City		33·4	317	i 6 28	0	—	—	—	—	—
Ottawa		33·9	15	e 6 32a	− 1	—	—	—	—	e 17·0
Riverside	z.	34·0	314	e 6 32	− 1	i 12 47	ScP	i 9 9	PcP	—
Mount Wilson	z.	34·6	314	e 6 38	0	—	—	—	—	—
China Lake	z.	35·1	317	i 6 42	− 1	i 12 53	ScP	i 9 12	PcP	—
La Paz		35·2	146	6 42	− 2	12 19	+12	i 7 55	PP	17·4
Logan		35·5	332	e 6 45	− 1	—	—	e 7 4	pP	—
Tinemaha	z.	36·3	318	e 6 51	− 2	—	—	i 9 16	PcP	—
Hungry Horse		41·4	334	i 7 35	0	—	—	i 9 31	PcP	—
Victoria	z.	45·9	328	e 8 11	0	—	—	—	—	—
College		65·8	337	i 10 32	− 2	—	—	—	—	—
Tamanrasset	z.	88·0	67	e 12 35	− 2	—	—	—	—	—

Additional readings :—
St. Louis e =6m.38s., 8m.0s., 8m.45s., and 10m.17s., iSS =10m.40s.
Tucson i =5m.47s.
Riverside iZ =9m.30s.
China Lake iZ =9m.33s.
La Paz SS =14m.33s.
Logan e =8m.44s.
Long waves were also recorded at Puebla and Vera Cruz.

Jan. 19d. 7h. Indian Ocean. Off Sumatra.

Djakarta eP =15m.42s., eS =19m.3s.
Istanbul eZ =17m.30s.
Kodaikanal eE =18m.11s.
Chatra e =18m.58s.
Hyderabad ePN =19m.21s., SN =23m.20s., SSN =23m.35s.
Khorog eP =21m.15s.
Kulyab eP =21m.22s., eS =28m.9s.
Kurmenty eP =21m.28s.
Stalinabad P =21m.28s., eS =28m.19s.
Fergana eP =21m.29s.
Obi-garm eP =21m.30s.
Andijan P =21m.31s.
Tashkent eP =21m.33s.
Frunse iP =21m.38s.
Samarkand eP =21m.46s.
Mary P =21m.55s.
Kabansk P =22m.13s.
Brisbane iPZ =22m.55s.k.
Tiflis eP =23m.29s.?.
Sverdlovsk P =23m.33s., S =32m.15s.
Bombay eEN =24m.29s. and 26m.47s.
Tamanrasset eP?Z =26m.10s.
College eP =30m.30s.
Hungry Horse iP =31m.54s., i =33m.48s.
Tucson eP =32m.12s., iPKP =35m.10s.
Logan eP? =34m.30s.
China Lake iPZ =35m.32s.

Jan. 19d. Readings also at 1h. (Tucson, near Akhalkalaki, Gandza, Stepanavan, and Tsikhlis-Dzhvari), 2h. (College, Tucson, and Tacubaya), 3h. (College), 4h. (Mineral, Shasta Dam, Hungry Horse, College, Ottawa, Brisbane, near Apia, Kulyab, near Khorog, and Obi-garm), 5h. (College), 6h. (Grahamstown, Pietermaritzburg, Rybach'e, Fergana, Obi-garm, near Andijan, Chilisk, Frunse, Ili, Kurmenty, Naryn, and near Krasnogorka), 7h. (near Yalta), 8h. (Ashkabad, near Mizusawa and near Istanbul), 9h. (Tamanrasset and near Balboa Heights), 10h. (Brisbane, New Delhi, Ashkabad, Tamanrasset, and College), 11h. (near Andijan), 12h. (Chatra), 14h. (Andijan, Kulyab, Stalinabad, near Khorog, and Obi-garm), 15h. (Ashkabad, Merida, and Tacubaya), 16h. (Tucson, and near Ottawa), 17h. (Puebla, Tacubaya, Vera Cruz, College, Tucson, and Hungry Horse), 18h. (College), 20h. (Apia and Ottawa), 22h. (Andijan and near Obi-garm).

Jan. 20d. 13h. 12m. 11s. Epicentre 14°·5N. 90°·5W. (as on 1950, Dec. 18d.).

A = −·0085, B = −·9685, C = +·2488 ; δ = −3 ; h = +6 ;
D = −1·000, E = +·009 ; G = −·002, H = −·249, K = −·969.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida		6·4	7	1 25	−13	2 37	−16	—	—	—
Vera Cruz		7·1	312	—	—	e 3 1	− 9	—	—	e 3·9
Puebla		8·6	303	e 2 49	P_g	e 4 15	S*	—	—	—
Tacubaya		9·6	302	i 2 33	+12	e 4 36	+24	—	—	—
Balboa Heights		12·0	116	e 2 45	−10	—	—	—	—	—
Tucson		25·6	318	e 5 32	0	e 10 30	+31	i 5 54	PP	e 13·8
Washington	z.	27·0	24	e 5 42	− 3	—	—	—	—	e 13·0
Bermuda		29·5	49	—	—	e 11 4	+ 2	—	—	e 14·0
Pierce Ferry		30·1	321	e 6 12	− 1	—	—	i 7 28	PP	—
Huancayo		30·4	149	e 6 10	− 6	—	—	—	—	e 13·0
Palomar	z.	30·4	314	i 6 16	0	—	—	—	—	—
Boulder City		30·5	320	i 6 18	+ 1	—	—	—	—	—
Overton	z.	30·6	321	e 6 18	0	—	—	—	—	—
China Lake	z.	32·2	318	i 6 30	− 2	—	—	—	—	—
Harvard		32·3	28	i 6 29	− 4	—	—	—	—	e 17·3
Logan		32·8	331	e 6 27	−10	—	—	—	—	—
Ottawa		33·2	19	e 6 41	+ 1	—	—	e 7 49	PP	e 16·1
Tinemaha	z.	33·4	318	i 6 42	0	—	—	—	—	—
Fresno	z.	34·2	317	i 6 41a	− 8	—	—	e 8 8	PP	—
Reno	z.	35·8	321	e 7 3a	0	—	—	e 8 32	PP	—
Mineral	z.	37·4	320	e 7 16k	0	—	—	—	—	—
La Paz		37·9	143	e 7 29	+ 9	—	—	—	—	19·3
Hungry Horse		38·9	336	i 7 27	− 2	—	—	—	—	—
Resolute Bay		60·2	359	e 10 7	− 5	—	—	—	—	31·8
Alicante		81·2	53	12 29	+10	—	—	(e 27 30)	SS	e 27·5

Additional readings :—
Tacubaya e = 2m.52s., i = 4m.44s.
Pierce Ferry i = 6m.45s.
Reno eE = 9m.40s.
Long waves were also recorded at Palisades, Pasadena, Granada, and Almeria.

Jan. 20d. Readings also at 3h. (Apia and near Tortosa), 4h. (near Huancayo), 5h. (College), 7h. (near La Paz), 8h. (Balboa Heights), 9h. (Piatigorsk, near Akhalkalaki, Gandzha, Gori, Grozny, Stepanavan, Tiflis, Tsikhlis-Dzhvari, and near Obi-garm), 10h. (Merida, Puebla, Tacubaya, Vera Cruz, Tucson, Hungry Horse, and College), 11h. and 12h. (near Apia), 16h. (Merida, Puebla, Tacubaya, and Vera Cruz), 21h. (College (2)), 22h. (near Tacubaya), 23h. (Huancayo (2), College, Calcutta, Chatra, Stuttgart, Tamanrasset, and near Obi-garm).

Jan. 21d. 12h. Undetermined shock.

Brisbane iPZ = 45m.22s.
Riverview iZ = 45m.48s., eE = 52m.34s., eN = 56m.14s., eLE = 60·8m.
Merida e = 46m.0s., i = 47m.46s.
Tacubaya e = 47m.44s. and 50m.40s.
Sverdlovsk P = 48m.56s., S = 58m.21s.
Puebla e = 49m.49s.
Huancayo eP = 50m.4s., eS? = 54m.48s.
Tucson eP = 50m.8s., iP = 50m.12s., iPcP = 53m.33s.
Pierce Ferry iP = 50m.47s., e = 53m.29s., iPcP = 53m.44s.
Palomar iPZ = 50m.50s., iZ = 51m.3s., iPcP = 53m.34s., iZ = 53m.45s.
Overton ePZ = 50m.52s., iPcPZ = 53m.57s., eSZ = 56m.24s.
Riverside iPZ = 50m.54s., iPcPZ = 53m.32s., iZ = 53m.46s.
Pasadena ePZ = 51m.1s., iZ = 51m.14s., iPcPZ = 53m.35s., iZ = 53m.49s., eZ = 56m.17s.
China Lake iPZ = 51m,5s., iPcPZ = 53m.36s., iZ = 53m.50s., eZ = 57m.58s.
Logan eP? = 51m.9s.
Ottawa ePZ = 51m.11s., e = 62m.12s.
Tinemaha eP?Z = 51m.16s., iPcPZ = 53m.40s., iZ = 53m.55s.
Lick eP?Z = 51m.34s., eZ = 51m.48s.
Mineral iPZ = 51m.51s.a, iZ = 54m.6s.
Hungry Horse iP = 51m.59s., iPP = 54m.8s.
Shasta Dam i = 53m.42s. and 54m.7s.
College iP = 54m.54s., i = 55m.8s.
Tamanrasset eZ = 56m.35s.
Long waves were also recorded at Djakarta, Harvard, Weston, and Palisades.

Jan. 21d. 18h. 51m. 16s. Epicentre 39°·1N. 23°·0E.

Intensity V at Aedipsos, Vasilika, Livanates, Argalasti; IV at Kymi, Martinon, Platinos, and Anchialos. Epicentre as given by Strasbourg.

A. Galanopoulos.
Seismo Institute Bull., 1951, Athens, 1952, p.13.

$A = +\cdot7163$, $B = +\cdot3040$, $C = +\cdot6281$; $\delta = +1$; $h = -1$;
$D = +\cdot391$, $E = -\cdot921$; $G = +\cdot578$, $H = +\cdot245$, $K = -\cdot778$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sofia	N.	3·6	4	i 0 57	− 1	e 2 41	S_g	i 1 10	P_g	—
Taranto		4·6	289	e 1 11	− 1	e 2 15	+ 8	—	—	—
Istanbul		5·1	65	e 1 11	− 9	e 2 23	+ 3	e 1 24	P	e 2·9
Bucharest		5·8	22	e 1 26	− 3	i 2 24	−14	e 1 58	P_g	2·8
Messina		5·9	264	e 1 27k	− 4	e 2 45	+ 5	—	—	—
Belgrade		6·0	342	e 1 34k	+ 2	e 3 29	S_g	e 2 4	P_g	e 3·6
Timisoara		6·8	349	e 2 20	P_g	e 3 19	+16	—	—	i 4·0
Rome	N.	8·5	293	e 3 4	P_g	e 3 44	− 1	e 4 8	S*	e 4·8
Kishinev		9·0	26	2 13	0	4 27	S*	—	—	—
Triest		9·4	317	e 2 27	+ 9	i 4 21	+14	e 3 9	PP	—
Bologna		10·3	306	—	—	e 4 28	− 2	—	—	e 5·3
Salo		11·3	309	e 4 11	?	e 5 18	+14	—	—	e 6·6
Ksara		11·6	113	—	—	e 5 30	+29	—	—	e 9·5
Prague		12·5	334	e 3 14	+12	e 5 39	+16	—	—	—
Zürich		13·4	313	—	—	e 5 2	−43	—	—	—
Stuttgart		13·9	319	e 3 23	+ 2	—	—	—	—	e 7·8
Collmberg	Z.	14·1	333	e 3 28	+ 5	—	—	—	—	—
Besançon		14·8	309	e 3 38	+ 6	—	—	e 8 46	PcP	—
Tamanrasset	Z.	22·0	228	e 4 57	− 1	—	—	—	—	e 10·6
College		76·1	357	e 11 46	− 5	—	—	—	—	—
Hungry Horse		84·9	333	i 12 36	− 2	—	—	—	—	—

Additional readings :—
Istanbul eP_gEZ =1m.28s., iS_g =2m.36s.
Bucharest eN =1m.49s.
Messina eZ =2m.32s.
Belgrade eP_gS_gNW =3m.18s.
Timisoara eE =2m.27s.
Triest eS_gS_g =5m.19s.
Prague e =3m.47s. and 4m.1s.
Stuttgart eZ =3m.42s.
Besançon e =4m.52s. and 5m.37s.
Long waves were also recorded at Athens, Ogyalla, Pavia, Strasbourg, De Bilt, and Kew.

Jan. 21d. Readings also at 0h. (College, Overton, Pierce Ferry, Bombay, near Chilisk, and near Kulyab), 1h. (La Plata and near La Paz), 2h. (Stuttgart), 3h. (Apia, Tacubaya, and Tamanrasset), 4h. (La Paz, near Huancayo, and near Andijan), 6h. (La Plata, Boulder City, Overton, Pierce Ferry, Hungry Horse, College, near Shasta Dam, Kurmenty, near Chilisk, and near Manila), 7h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Overton, Pierce Ferry, Berkeley, Lick, Mineral, Shasta Dam, Hungry Horse, College, Brisbane, Stuttgart, near Chilisk, and near Balboa Heights), 8h. (near Khorog and near Bogota), 9h. (Apia, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Overton, Pierce Ferry, Lick, and Mineral), 10h. (College, Merida, and Tacubaya), 11h. (Brisbane, Chatra, Tucson, Overton, Pierce Ferry, Hungry Horse, and College (3)), 12h. (Algiers Univ. and Tamanrasset), 13h. (Chatra and near Manila), 14h. (College and near Apia), 15h. (Brisbane, College, and near Balboa Heights), 16h. (Tamanrasset, Tucson, Overton, Pierce Ferry, College, near Apia (2), and near Kurmenty), 17h. (Apia (2) and College), 18h. (near Huancayo), 19h. (Pasadena, Riverside, China Lake, Tinemaha, Overton, Pierce Ferry, College, and near Klyuchi), 20h. (Tacubaya, Erevan, near Akhakalaki, Borzhomi, Gandzha, Gori, Stepanavan, Tiflis, and Tsikhlis-Dzhvari), 21h. (Hungry Horse, near Shasta Dam, and near Djakarta), 22h. (China Lake, Overton, Pierce Ferry, College, and Collmberg), 23h. (near Balboa Heights).

Jan. 22d. 10h. Undetermined shock.

Auckland iP?N =32m.42s.?, eS?N =34m.30s.?.
Tuai eP?N =33m.54s., eN =34m.22s.
Kaimata ePNE =34m.0s., iNE =36m.5s.
Wellington eS? =35m.0s., eSSS? =35m.45s., i =36m.25s., e =37m.25s.
Christchurch eS? =36m.4s., eEN =36m.50s.
Brisbane iPE =36m.17s., iPPZ =36m.52s., eSE =40m.41s.
Riverview ePEZ =36m.19s., ipPZ =36m.28s., iZ =36m.48s., iPPE =37m.2s., eSE = 40m.51s., eLE =43·9m.
Apia eSEN =39m.10s.
Pasadena eZ =43m.29s., eLE =76m.
Palomar eZ =43m.36s.
Riverside eZ =43m.38s.
Fresno ePZ =43m.38s.?k, eZ =44m.3s.
China Lake iPZ =43m.42s.
Tinemaha ePZ =43m.45s.
Shasta Dam eP =43m.46s.
Boulder City eP =43m.51s.
Tucson eP =43m.52s., ePKKP =61m.20s., eL =77m.47s.
Pierce Ferry iP =43m.54s., i =44m.9s. and 44m.19s.
Overton ePZ =43m.55s.
Mineral eZ =44m.0s.a, iZ =45m.44s.
La Paz ePZ =44m.18s., PP =48m.24s., iSKS =55m.0s., eS? =55m.26s., iPS =57m.17s., L =81·5m.
College eP =44m.35s., e =47m.45s.
Tamanrasset ePKPZ =50m.57s., eZ =51m.26s., ePKP$_2$Z =52m.8s., ePPZ =55m.58s., LZ =119m.
Ksara e =50m.44s., 54m.8s., and 119m.18s.?.
Granada ePKP =51m.12s.a, PP =57m.3s., PPP =60m.34s., SKSP =67m.37s., SS = 77m.52s., L =128·1m.
Stuttgart ePKPZ =51m.13s.?, ePKP$_2$Z =51m.38s., eZ =51m.52s.
Alicante PKP =51m.15s., PPP =60m.4s., SS =75m.20s., SSP =76m.45s., Q =98m.55s., eL =106m.10s.
Collmberg eZ =51m.24s.
Strasbourg ePKP$_2$ =51m.42s.
Almeria PKP =51m.45s., PKP$_2$ =53m.9s., PP =57m.1s., SS =78m.17s., L =128m.35s.
Huancayo eSKS? =54m.48s., e =56m.54s., eSS =61m.42s., eL =74m.30s.
Rome ePPZ =55m.23s., eSKSN =57m.29s., eSSN =76m.0s.
Malaga iPKP =56m.8s., iPKS =59m.26s., eSKS =63m.12s., L =125m.9s.
Athens 70m.
Paris iSSS? =86m.6s., i =86m.11s.
Long waves were also recorded at Harvard, Palisades, Seven Falls, and Ottawa.

Jan. 22d. 12h. 16m. 0s. Epicentre 17°·6S. 41°·3E. (as on 1938, Oct. 23d.).

A = +·7165, B = +·6295, C = −·3005; δ = −6; h = +5;
D = +·660, E = −·751; G = −·226, H = −·198, K = −·954.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tananarive		6·1	103	i 1 34	0	2 50	+ 5	i 1 46	P*	3·8
Pretoria	Z.	14·6	234	i 3 35	+ 5	—	—	—	—	—
Pietermaritzburg	Z.	15·6	217	i 2 22	?	—	—	—	—	—
Grahamstown	Z.	20·5	217	i 4 54	+12	—	—	—	—	—
Colombo	N.	45·2	61	8 10	−10	14 55	− 6	—	—	20·4
Kodaikanal	E.	45·2	55	i 8 16	− 4	i 14 50	−11	10 0	PP	20·5
Bombay		47·7	42	e 8 40	0	e 15 34	− 2	—	—	—
Poona	E.	48·1	44	i 8 43	0	i 15 40	− 2	—	—	—
Helwan		48·2	349	i 8 42k	− 2	15 41	− 2	10 12	PcP	—
Hyderabad	N.	50·9	49	9 2	− 3	16 4	−17	19 57	SS	—
Ksara		51·4	355	e 9 8	− 1	—	—	—	—	—
Tamanrasset	Z.	53·3	318	i 9 27k	+ 4	e 16 58	+ 4	i 10 47	PcP	21·0
Lenkoran		56·5	7	9 46	0	—	—	—	—	—
Ashkabad		57·5	16	i 9 54	+ 1	—	—	—	—	—
New Delhi	N.	57·6	38	e 10 9	+15	i 17 44	− 7	—	—	e 27·9
Erevan		57·6	3	e 9 49	− 5	—	—	—	—	—
Leninakan		58·1	2	e 9 58	0	—	—	—	—	—
Baku		58·2	9	e 9 58	0	—	—	—	—	—
Mary		58·2	19	i 9 57	− 1	—	—	—	—	—
Tiflis		59·1	4	e 10 5	+ 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Borzhomi		59·2	2	10 3	− 2	—	—	—	—	—
Istanbul	z.	59·5	350	e 10 7	0	—	—	—	—	—
Messina		60·5	337	e 10 18k	+ 4	—	—	—	—	—
Grozny		60·8	5	10 18	+ 2	e 18 30?	− 3	—	—	—
Calcutta	E.	60·9	52	e 10 1	−16	i 18 34	0	10 36	PcP	—
Stalinabad		61·5	24	i 10 20	− 1	i 18 40	− 2	—	—	—
Khorog		61·8	27	i 10 24?	+ 1	i 18 42?	− 4	—	—	—
Samarkand		61·9	23	e 10 21	− 3	—	—	—	—	—
Obi-garm		62·0	25	i 10 9?	−15	i 18 29?	−19	—	—	—
Taranto		62·0	340	10 32	+ 8	18 47	− 1	e 22 43	SS	—
Chatra	z.	62·7	47	i 10 27	− 2	—	—	—	—	—
Lunacharskoe		64·1	23	e 10 39	+ 1	—	—	—	—	—
Tashkent		64·1	23	e 10 36	− 2	i 19 5	− 9	—	—	—
Fergana		64·3	26	i 10 38	− 1	e 19 12	− 5	—	—	—
Andijan		64·8	26	i 10 41	− 2	i 19 19	− 4	—	—	—
Djakarta		64·8	89	i 10 45	+ 2	e 19 32	+ 9	—	—	—
Rome		64·9	337	i 10 44k	+ 1	e 19 27	+ 3	i 11 21	PcP	—
Belgrade		65·0	345	i 10 46k	+ 2	—	—	—	—	e 44·7
Algiers Univ.	z.	65·1	327	i 10 47k	+ 2	—	—	i 11 20	PcP	—
Tchimkent		65·1	23	i 10 43	− 2	—	—	—	—	—
Kishinev		65·3	350	i 10 46	0	—	—	—	—	—
Naryn		66·9	28	e 11 11?	+15	—	—	i 11 25	PcP	—
Frunse		67·5	27	i 11 0	0	e 19 50	− 6	—	—	—
Bologna		67·6	338	e 11 17	+16	—	—	—	—	—
Triest		67·7	341	i 11 1	0	—	—	—	—	e 43·5
Rybach'e		67·8	27	i ' 1	− 1	e 19 57	− 3	—	—	—
Alicante		68·1	326	e 50	−14	e 19 50	−13	11 20	PcP	31·7
Almeria		68·1	324	i 11 8	+ 4	i 20 17	+14	13 41	PP	35·7
Almata		68·8	27	11 9	+ 1	—	—	—	—	—
Salo	z.	68·8	338	e 11 10	+ 2	—	—	—	—	—
Granada		69·0	323	i 11 15s	+ 6	i 20 20	+ 6	11 58	PcP	i 34·4
Pavia		69·0	336	i 11 10	+ 1	—	—	e 12 33	PcP	—
Kurmenty		69·3	29	e 11 11	0	—	—	—	—	—
Tortosa		69·4	328	i 11 16	+ 4	20 14	− 4	25 9	SS	e 37·0
Chur		70·2	338	e 11 18	+ 1	e 20 10	−18	—	—	—
Zürich		71·0	338	e 11 22k	0	e 20 36	− 1	—	—	—
Toledo		71·1	325	i 11 25	+ 3	e 20 46	+ 8	e 14 7	PP	35·8
Prague		71·4	334	i 11 24	0	e 20 50	+ 8	e 11 41	PcP	e 39·0
Basle		71·5	337	e 11 26	+ 2	—	—	e 12 57	?	—
Besançon		71·9	336	i 11 28	+ 1	—	—	—	—	—
Stuttgart		72·0	340	i 11 28k	0	e 20 48	− 1	i 12 6	PcP	e 41·0
Strasbourg		72·3	338	i 11 31	+ 2	e 21 0	+ 8	e 11 52	PcP	e 39·0
Karlsruhe	z.	72·5	339	i 11 31	+ 1	—	—	—	—	—
Collmberg	z.	73·0	342	e 11 33	0	—	—	—	—	—
Jena		73·1	342	e 11 34	0	—	—	—	—	—
Moscow		73·1	359	i 11 34	0	e 20 56	− 5	—	—	—
Paris		74·6	335	i 11 44	+ 1	i 21 20	+ 2	i 11 52	PcP	e 39·0
Sverdlovsk		75·9	12	i 11 49	− 1	21 20?	−12	—	—	—
Copenhagen		77·0	345	i 11 56a	0	i 21 43	− 2	—	—	—
Kew		77·8	336	i 12 5	+ 4	e 21 43	−10	e 22 49	PS	e 39·0
Rathfarnham Castle		81·6	334	i 12 26	+ 5	e 22 .0	+ 7	24 32	PPS	e 40·0
Irkutsk		88·3	34	12 56	+ 1	23 40	+ 1	e 16 37	PP	—
Nanking		89·0	56	i 12 58k	0	23 48	+ 3	—	—	—
Kabansk		89·5	34	13 4	+ 4	23 52	+ 2	—	—	—
Riverview		95·9	129	—	—	e 24 27	(+ 3)	e 26 14	PS	e 45·9
Vladivostok		102·2	49	e 17 53	PP	e 36 36	SSS	—	—	—
La Paz		102·7	249	e 14 5	+ 5	i 24 36	[− 4]	18 14	PP	48·9
Mizusawa	E.	108·4	54	—	—	e 12 43	?	—	—	—
Huancayo		110·9	250	e 18 33	[− 2]	e 25 30	[+14]	e 28 51	PS	e 45·1
San Juan		110·9	284	i 18 39	[+ 4]	—	—	—	—	e 88·2
Bermuda		112·5	299	—	—	e 29 10	PS	e 35 15	SS	e 51·5
Bogota		115·6	268	i 19 2	[+18]	e 28 54	PS	—	—	e 62·0
Resolute Bay	z.	118·2	349	e 18 53	[+ 4]	—	—	—	—	—
Ottawa		121·2	314	i 19 0	[+ 5]	—	—	—	—	e 55·0
Chicago		130·3	311	e 22 14	PP	—	—	—	—	e 69·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		132·4	6	e 19 19	[+ 2]	e 31 9	PS	—	—	—
St. Louis		133·0	307	i 19 25	[+ 7]	i 22 54	SKP	e 21 45	PP	—
Florissant		133·1	307	—	—	e 22 52	SKP	—	—	—
Rapid City	E.	140·2	329	e 19 40	[+ 9]	e 23 20	SKP	—	—	e 77·9
Tacubaya		142·5	280	e 19 39	[+ 4]	—	—	—	—	—
Hungry Horse		143·3	333	i 19 37	[+ 1]	—	—	e 22 48	PP	—
Logan		146·7	323	e 19 48	[+ 6]	—	—	e 22 22	PP	—
Victoria	Z.	146·7	341	e 19 50a	[+ 8]	—	—	—	—	—
Seattle		147·1	339	e 19 49k	[+ 6]	—	—	i 19 59	PKP_2	—
Salt Lake City		147·3	321	e 19 50	[+ 7]	—	—	—	—	—
Tucson		150·9	306	e 19 55	[+ 6]	—	—	e 23 11	PP	e 84·0
Pierce Ferry		151·4	316	i 19 57	[+ 7]	—	—	—	—	—
Overton	Z.	151·5	317	i 19 57	[+ 7]	e 30 7	{−19}	i 20 3	PKP_2	—
Boulder City		152·0	317	i 19 58	[+ 8]	—	—	i 20 52	PKP_2	—
Reno		152·7	327	e 19 58k	[+ 7]	—	—	—	—	—
Mineral	Z.	152·9	331	e 19 57k	[+ 5]	—	—	e 23 44	PP	—
Shasta Dam		153·0	333	i 19 57	[+ 5]	—	—	—	—	—
Haiwee	Z.	153·2	319	i 20 1	[+ 9]	—	—	e 24 5	PP	—
Tinemaha	Z.	153·5	321	i 20 0	[+ 7]	—	—	e 24 2	PP	—
Arcata		153·6	335	e 19 58k	[+ 5]	—	—	—	—	—
China Lake	Z.	153·9	319	i 20 0k	[+ 7]	—	—	e 23 53	PP	—
Fresno	Z.	154·7	324	e 20 0	[+ 6]	—	—	e 23 22	PP	—
Palomar	Z.	154·9	314	i 20 1	[+ 7]	—	—	—	—	—
Riverside	Z.	154·9	315	i 20 1k	[+ 7]	—	—	e 24 0	PP	—
Berkeley	Z.	155·2	327	e 20 1k	[+ 6]	—	—	—	—	—
Lick	Z.	155·3	327	e 20 2a	[+ 7]	—	—	e 23 56	PP	—
Pasadena		155·3	315	i 20 2k	[+ 7]	—	—	e 24 9	PP	e 84·0

Additional readings :—
Tananarive P = 2m.22s., iS* = 3m.1s., i = 3m.22s.
Kodaikanal SSE = 17m.52s., QE = 18m.22s.
Helwan eZ = 8m.51s. and 10m.4s., eN = 19m.34s.
Tamanrasset ePPZ = 11m.25s., eZ = 11m.53s., ePPPZ = 12m.32s., $ePcSZ$ = 14m.21s., eZ = 17m.28s., $eScSZ$ = 19m.1s.
New Delhi eN = 18m.23s. and 23m.57s.
Messina e = 11m.10s.
Calcutta PPE = 12m.22s., $PcSE$ = 14m.30s., PSE = 18m.54s., QE = 26m.41s.
Rome eSSN = 23m.51s.
Belgrade iZ = 10m.56s.
Algiers Univ. eZ = 10m.58s.
Triest iZ = 11m.16s.
Alicante PP = 13m.12s., PS = 20m.12s., PPS = 20m.23s., Q = 27m.20s.
Almeria PPP = 15m.23s., SS = 24m.29s.
Salo eZ = 11m.23s.
Granada iPP = 13m.59s., PS = 21m.4s., SS = 25m.15s., SSS = 28m.7s.
Pavia e = 11m.16s. and 11m.37s.
Tortosa S?E = 20m.22s.
Toledo i = 11m.34s.
Prague eN = 11m.32s., e = 12m.5s., 12m.40s., and 16m.40s.
Besançon e = 11m.36s.
Stuttgart iZ = 11m.36s., eZ = 11m.39s. and 12m.49s., eS = 21m.0s., eSSS = 29m.6s.
Strasbourg i = 11m.42s., ePP = 14m.5s.
Collmberg eZ = 11m.44s.
Jena eE = 11m.43s.
Paris i = 21m.26s., iSP = 22m.15s.
Kew iZ = 12m.15s., ePPPEN = 13m.31s.
Irkutsk PS = 24m.42s.
La Paz SKKS = 25m.12s., PS = 27m.16s., iPPS = 28m.16s.
Huancayo e = 26m.36s., eSSS? = 39m.7s.
St. Louis i = 19m.36s. and 19m.43s.
Rapid City eE = 31m.13s.
Seattle i = 19m.55s., 20m.2s., 20m.24s., and 20m.56s., e = 21m.12s., 21m.44s., and 22m.19s.
Tucson i = 20m.1s.
Pierce Ferry i = 20m.2s. and 20m.13s.
Boulder City e = 21m.38s.
Mineral iZ = 20m.4s., 20m.26s., and 23m.57s.
Haiwee iZ = 20m.8s. and 20m.20s.
Tinemaha iZ = 20m.7s., 20m.19s., and 20m.34s.
Arcata eE = 22m.54s.
China Lake iZ = 20m.7s., 20m.19s., and 20m.48s.
Fresno eZ = 20m.9s. and 20m.22s.

Continued on next page.

Palomar iZ = 20m.11s. and 20m.27s.
Riverside iZ = 20m.9s. and 20m.24s.
Berkeley iZ = 20m.10s. and 20m.18s.
Lick eZ = 20m.9s., 20m.21s., and 20m.56s.
Pasadena iZ = 20m.10s., 20m.13s., and 20m.21s., iPPZ = 24m.20s.
Long waves were also recorded at Harvard, Palisades, Seven Falls, Cleveland, Weston Merida, Puebla, Tacubaya, Christchurch, Wellington, Ivigtut, Barcelona, De Bilt, and Upsala.

Jan. 22d. 15h. 14m. 52s. Epicentre 39°·1N. 120°·0W. (given by U.S.C.G.S.).

A = −·3891, B = −·6739, C = +·6281 ; δ = +5 ; h = −1 ;
D = −·866, E = +·500 ; G = −·314, H = −·544, K = −·778.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Clara		2·3	221	e 0 41	+ 1	i 1 10	+ 1	—	—	—
Shasta Dam		2·4	311	i 0 42	+ 1	i 1 14	+ 2	—	—	—
Tinemaha		2·5	146	e 0 42	− 1	i 1 21	S_g	i 0 47	P_g	—
Haiwee		3·4	151	e 1 0	P*	i 1 46	S*	—	—	—
China Lake	z.	3·8	149	e 1 1	0	i 2 0	S*	i 1 10	P*	—
Santa Barbara		4·6	177	e 1 22	P*	e 2 22	S*	—	—	—
Overton	z.	5·1	118	i 1 19	− 1	—	—	i 1 39	P_g	e 2·8
Boulder City		5·2	126	e 1 26	+ 5	i 3 1	S_g	i 1 44	P_g	—
Pasadena		5·2	163	e 1 20	− 1	i 2 37	S*	i 1 33	P*	—
Riverside	z.	5·5	157	e 1 25	0	—	—	—	—	—
Pierce Ferry		5·6	120	i 1 25	− 2	i 2 50	S*	—	—	i 3·0
Logan		6·8	64	e 2 7	P_g	—	—	—	—	e 3·6
Hungry Horse		10·2	23	e 2 42	+11	—	—	—	—	—

Long waves were also recorded at Tucson.

Jan. 22d. Readings also at 2h. (Boulder City and Chatra), 3h. (Collmberg, Stuttgart (2), and Strasbourg), 4h. (Bogota, Merida, Puebla, Tacubaya, Palomar, Pasadena, China Lake (2), Tinemaha, Tucson (2), Overton (2), Pierce Ferry (2), Hungry Horse (2), and College), 5h. (Tacubaya), 6h. (Algiers Univ.), 9h. (Huancayo (2)), 10h. (Ashkabad), 11h. (Triest and near Manila), 12h. (Algiers Univ., Kurmenty, Naryn, near Chilisk, Krasnogorka, and near Balboa Heights), 13h. (Palomar (2), Pasadena (2), Riverside, China Lake (2), Tinemaha (2), Tucson (2), Boulder City, Overton, Pierce Ferry (2), Lick, Fresno, Shasta Dam, Mineral, Hungry Horse (2), College (2), Logan, Ottawa, Kaimata, Wellington, Brisbane, and Chatra), 14h. (Paris, Strasbourg, and Stuttgart), 16h. (Brisbane, Shasta Dam, Hungry Horse, College, and near Manila), 18h. (near Klyuchi), 21h. (College), 22h. (Resolute Bay), 23h. (Riverside, China Lake, Tucson (2), Boulder City, Overton (2), Pierce Ferry (3), Mineral, Shasta Dam, Hungry Horse, College, Huancayo, Strasbourg, Stuttgart, Basle, Zürich, Paris, Jena, Collmberg, and Tacubaya).

Jan. 23d. 6h. 52m. 41s. Epicentre 55°·0S. 136°·5W.

A = −·4180, B = −·3966, C = −·8173 ; δ = −1 ; h = −7 ;
D = −·688, E = +·725 ; G = +·593, H = +·563, K = −·576.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Christchurch		34·4	268	7 16	+25	12 29	+10	e 8 14	PP	16·2
Wellington		34·5	273	—	—	i 12 56	+36	—	—	e 14·3
Apia		49·4	314	—	—	e 20 48	SSS	—	—	23·2
Riverview	E.	53·2	262	e 9 23	+ 1	e 16 59	+ 7	e 11 24	PP	e 22·9
Buenos Aires		55·9	103	e 9 41	− 1	17 50	+21	—	—	—
La Plata		56·0	103	9 37	− 6	17 7	−23	20 55	SS	23·4
Brisbane		56·9	269	i 9 49a	0	e 17 48	+ 6	—	—	—
Huancayo		63·8	73	i 10 37	+ 1	i 19 21	+10	—	—	e 27·0
La Paz		64·3	82	i 10 39k	0	i 19 19	+ 2	i 20 29	SKS	30·3
Bogota		78·4	65	e 12 1	− 3	i 22 2	+ 2	e 12 8	P	37·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tacubaya		80·6	36	e 12 40	+24	—	—	—	—	—
Palomar	Z.	89·6	17	i 13 3	+ 2	—	—	—	—	—
Tucson		89·6	22	e 13 0	− 1	e 24 0	+ 9	e 17 7	PP	e 41·4
Riverside	Z.	90·1	16	e 13 3	0	—	—	—	—	—
Pasadena		90·2	16	e 13 5	+ 1	e 29 54	SS	e 16 38	PP	e 37·3
China Lake	Z.	91·9	15	e 13 10	− 1	—	—	—	—	—
Boulder City		92·5	18	e 13 17	+ 3	—	—	—	—	—
Fresno	Z.	92·5	13	e 13 15	+ 1	—	—	e 17 8	PP	e 44·3
Pierce Ferry		92·8	18	e 13 13	− 3	—	—	—	—	—
Santa Clara	E.	92·8	11	—	—	e 32 5	?	—	—	e 40·9
Lick	Z.	92·9	11	e 13 15a	− 1	—	—	—	—	—
Tinemaha	Z.	93·0	14	e 13 15	− 2	—	—	—	—	—
Overton	Z.	93·1	17	i 13 7	−10	—	—	—	—	—
Berkeley		93·3	11	e 13 25k	+ 7	e 24 50	+26	—	—	e 43·6
San Juan		94·2	64	e 17 42	PP	e 24 1	[+ 4]	e 30 52	SS	e 41·0
Reno		95·2	13	e 13 33	+ 6	—	—	—	—	e 45·0
Mineral	Z.	95·8	11	i 13 36k	+ 7	—	—	—	—	—
Shasta Dam		96·1	10	i 13 28	− 3	—	—	—	—	—
Logan		98·7	18	e 13 56	+14	e 24 16	[− 5]	e 17 52	PP	e 45·3
Djakarta		99·8	244	—	—	e 24 33	[+ 7]	—	—	—
St. Louis		101·3	35	—	—	e 24 52	[+19]	i 32 47	SS	—
Bozeman		102·6	18	—	—	e 23 43	?	e 32 50	SS	e 43·7
Rapid City	E.	102·7	24	e 23 45	?	e 24 31	[− 9]	e 28 5	PPS	e 42·7
Morganstown		105·9	42	—	—	e 23 39	?	—	—	—
Washington	Z.	106·4	45	—	—	e 32 59?	SS	—	—	e 54·5
Bermuda		106·5	57	—	—	e 34 0	SS	—	—	e 44·8
Cleveland		106·9	40	i 15 55a	P	i 31 9	?	—	—	—
Palisades		109·5	46	—	—	e 28 37	PS	—	—	e 53·3
Saskatoon		109·6	19	i 20 55	?	—	—	—	—	54·8
Harvard		111·7	46	i 17 53	[−44]	e 28 55	PS	—	—	e 52·9
Sitka		111·7	1	—	—	e 35 29	SS	—	—	e 51·4
Ottawa		112·4	41	e 15 51k	P	e 29 19	PS	e 35 1	SS	e 55·3
Seven Falls	E.	115·8	43	—	—	e 29 49	PS	e 30 55	PPS	48·8
College		119·8	353	—	—	e 29 52	PS	e 36 55	SS	e 55·9
Kodaikanal	E.	127·9	224	—	—	e 38 35	SS	—	—	—
Tamanrasset	Z.	137·2	123	e 19 22	[− 3]	—	—	e 22 5	PP	—
Bombay	N.	137·6	224	e 22 39	PP	—	—	—	—	—
Malaga		142·8	98	i 23 1	PP	e 29 11	PKKP	i 26 11	PPP	67·4
Kabansk		143·5	293	19 49	[+12]	e 20 37	?	16 55	?	—
Granada		143·6	98	23 43	PP	34 19	PS	47 12	SSS	i 76·2
Almeria		144·0	100	19 47	[+10]	26 59	[+14]	i 23 13	PP	71·7
New Delhi		144·2	237	e 20 41	?	—	—	—	—	e 73·2
Irkutsk		144·8	292	e 19 47?	[+ 8]	—	—	—	—	—
Toledo		145·2	95	i 19 26	[−14]	—	—	e 22 44	PP	71·1
Alicante		146·2	100	19 7	[−34]	25 37	?	22 22	PP	e 65·1
Algiers Univ.	Z.	147·1	107	e 19 46	[+ 3]	e 27 5	PPP	e 23 28	PP	—
Scoresby Sund		148·2	35	e 19 47	[+ 2]	—	—	—	—	72·3
Tortosa		148·4	98	20 2	[+17]	30 42	{+33}	20 22	PKP_2	78·3
Rathfarnham Castle		151·3	72	e 19 50	[+ 1]	—	—	e 20 16	PKP_1	e 65·8
Helwan		153·4	156	e 20 1	[+ 9]	—	—	24 7	PP	—
Kew		153·9	79	e 31 5	?	e 49 35	SSS	e 43 19	SS	e 67·3
Paris		154·2	86	e 19 57	[+ 4]	i 43 16	SS	i 20 9	PKP_2	e 69·3
Naryn		154·7	253	i 23 32	PKS	—	—	—	—	—
Kulyab		155·3	237	e 19 23	[−32]	—	—	—	—	—
Almata		155·4	257	e 20 11	[+16]	—	—	—	—	—
Rybach'e		155·4	255	e 20 19	[+24]	—	—	—	—	—
Rome	Z.	155·8	109	e 20 12	[+16]	e 23 18	PKS	e 23 51	PP	—
Obi-garm		156·0	239	e 19 31	[−25]	—	—	—	—	—
Pavia		156·1	99	e 20 18	[+22]	i 26 31	[−30]	—	—	e 56·9
Andijan		156·2	246	e 19 13	[−43]	—	—	—	—	—
Fergana		156·2	245	e 19 15	[−41]	—	—	—	—	—
Stalinabad		156·3	238	e 19 30	[−26]	—	—	—	—	—
Frunse		156·5	253	e 20 14	[+17]	—	—	—	—	—
Basle		156·5	93	e 20 17	[+20]	—	—	—	—	—
Zürich		157·0	93	e 20 3	[+ 6]	—	—	—	—	—

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
De Bilt		157·2	80	—	—	e 47 19	?	—	—	e 70·3
Strasbourg		157·2	90	e 19 58	[+ 1]	—	—	e 20 19	PKP_2	e 65·3
Karlsruhe	z.	157·8	89	e 20 7	[+ 9]	—	—	—	—	—
Stuttgart		158·1	92	e 20 4	[+ 5]	e 26 41	[−22]	e 20 18	PKP_2	e 70·3
Ksara		158·2	163	18 49?	?	—	—	—	—	—
Tashkent		158·2	243	e 19 45	[−14]	—	—	e 20 25	PKP_2	—
Mary		158·6	225	e 19 43	[−16]	—	—	—	—	—
Triest		159·0	103	e 29 56	PKKP	e 44 48	SS	—	—	e 66·3
Ashkabad		160·2	218	19 46	[−15]	—	—	—	—	—
Jena	E.	160·5	89	e 20 5	[+ 4]	—	—	e 20 51	PKP_2	—
Collmberg	z.	161·4	89	e 20 7	[+ 5]	—	—	e 20 51	PKP_2	—
Prague		161·7	93	e 23 43	PKS	e 25 27	?	e 24 25	PP	e 63·3
Sverdlovsk		170·2	288	20 4	[− 5]	32 2	(− 2)	21 41?	PKP_2	—

Additional readings :—
Christchurch eQEN =14m.14s., eZ =14m.54s.
La Plata ScSE =18m.37s., N =20m.49s. and 22m.43s., QE =22·9m.
Brisbane iPE =9m.52s., eEN =17m.56s.
Huancayo e =10m.53s.
La Paz iZ =10m.59s. and 12m.29s., i =19m.47s., SS =23m.39s., Q =27·0m.
Palomar eZ =13m.14s.
Tucson eSKS =23m.48s., e =24m.31s.
Pasadena iZ =13m.14s. and 17m.0s.
Fresno eZ =13m.23s.
Lick eZ =13m.23s.
Berkeley eZ =13m.32s.
Reno eEZ =14m.5s., eN =14m.53s.
Mineral iZ =14m.3s.
Logan e =14m.6s., eS =24m.51s., ePS =26m.38s.
St. Louis e =28m.21s., i =31m.34s. and 34m.54s., eSSS? =36m.17s., i =37m.41s.
Cleveland iN =31m.24s. and 32m.2s., iE =32m.7s.
Ottawa e =16m.6s.
Tamanrasset eZ =19m.28s.
Granada Q =70m.13s.
Toledo i =19m.42s. and 19m.47s., e =23m.18s.
Alicante PP =25m.17s., SSS =45m.15s., Q =58m.7s.
Algiers Univ. ePKP$_2$Z =19m.50s., eZ =20m.29s.
Scoresby Sund i =20m.7s.
Helwan eZ =23m.52s., PPPZ =27m.40s.
Paris e =20m.22s., i =20m.29s. and 21m.1s., ePP =23m.31s.?, i =26m.18s., iSSP = 44m.27s., eSSS =49m.39s., e =53m.10s.
Rome eZ =25m.22s.
Strasbourg e =21m.10s. and 22m.40s.
Stuttgart ePP =24m.4s., e =24m.47s., eSKKS? =30m.1s., eSS =43m.31s., e =54m.25s.
Jena eN =18m.46s. and 20m.54s.
Sverdlovsk eSS =46m.13s.
Long waves were also recorded at Grahamstown, Tananarive, Ukiah, Victoria, Aberdeen, Skalnate Pleso, Upsala, Clermont-Ferrand, and Belgrade.

Jan. 23d. 7h. Alaska. Suggested depth 100km.

College iP =1m.13s., i =1m.41s., iL =2m.48s.
Sitka eS =4m.45s., iL =5m.30s.
Victoria eZ =5m.0s.
Seattle eP? =5m.18s., e =5m.31s.
Resolute Bay PZ =5m.27s., eZ =9m.36s.
Hungry Horse iP =5m.43s., eS =9m.35s.
Shasta Dam iP =6m.19s.
Mineral iP?Z =6m.32s.
Lick eP?Z =6m.41s.k.
China Lake iPZ =7m.4s., eZ =7m.20s., ipPZ =7m.26s.
Pierce Ferry iP =7m.15s.
Pasadena iPZ =7m.15s., ipPZ =7m.35s.
Riverside iPZ =7m.20s., ipPZ =7m.40s.
Overton iPZ =7m.22s.
Palomar iPZ =7m.27s., ipPZ =7m.46s.
Tucson iP =7m.55s., epP =8m.8s., esP =8m.18s.
Harvard iP =9m.6s.
Weston eP =9m.7s., eQ =21m.36s.
Collmberg eZ =11m.13s.
Stuttgart ePZ =11m.27s.

Jan. 23d. Readings also at 0h. (Boulder City, Tucson, near Bucharest, and near Khorog), 2h. (Tamanrasset), 3h. (near Khorog), 4h. (near Tacubaya and near Djakarta), 5h. (Palomar, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, College, Stuttgart, Chilisk, Khorog, Obi-garm, Tashkent, Tchimkent, near Almata, Andijan, Dzhergetal, Fergana, Frunse, Krasnogorka, Kurmenty, Naryn, and Rybach'e), 7h. (Frunse, near Almata, Chilisk, Naryn, and Rybach'e), 8h. (Andijan), 10h. (near Chilisk), 11h. (Prague and near Tacubaya), 14h. (near Tacubaya), 15h. (Strasbourg), 19h. (Collmberg and near Kurmenty), 20h. (Fergana, Kulyab, Naryn, Obi-garm, near Andijan, Dzhergetal, and Khorog), 21h. (Collmberg), 22h. (Khorog, Triest, and near Tacubaya), 23h. (Chatra and near Victoria).

Jan. 24d. 0h. Undetermined shock. U.S.C.G.S. suggests depth 200km.

Brisbane iPZ = 50m.34s.a, iPPZ = 50m.44s., iSEN = 54m.8s.
Kaimata eNE = 52m.
Berkeley iPZ = 58m.20s.k, ipP?Z = 59m.13s.
Lick iPZ = 58m.22s.k, ipP?Z = 59m.14s.
College iP = 58m.25s., epP = 59m.17s.
Shasta Dam iP = 58m.25s., epP = 59m.17s.
Fresno ePZ = 58m.28s.k, epP?Z = 59m.22s., eZ = 60m.2s., eN = 62m.34s.
Pasadena iPZ = 58m.28s., ipPZ = 59m.22s.
Reno ePE = 58m.31s., eZ = 59m.16s.
Riverside iPZ = 58m.31s., ipPZ = 59m.25s.
Palomar iPZ = 58m.33s., ipPZ = 59m.29s.
China Lake iPZ = 58m.34s., ipPZ = 59m.26s.
Tinemaha iPZ = 58m.34s., ipPZ = 59m.27s.
Victoria eZ = 58m.37s.
Boulder City eP = 58m.45s., epP = 59m.38s.
Overton iPZ = 58m.48s., ipPZ = 59m.41s.
Pierce Ferry iP = 58m.48s., ipP = 59m.42s.
Tucson eP = 58m.55s., epP = 59m.48s., ipP = 59m.54s.
Logan eP = 59m.3s., epP = 59m.56s.
Hungry Horse iP = 59m.4s., epP = 59m.56s.
Mineral iPZ = 59m.27s.k, iZ = 60m.20s. and 60m.24s.
Collmberg eZ = 65m.6s. and 65m.16s.
Stuttgart ePKPZ = 65m.13s., eZ = 65m.20s., 65m.23s., and 66m.17s.
Algiers Univ. ePKPZ = 65m.48s.
Tamanrasset ePKPZ = 65m.51s., ePKP$_2$Z = 66m.33s., ePPZ = 69m.46s.

Jan. 24d. 4h. 49m. 25s. Epicentre 60°·0S. 23°·0W

Approximate.

$A = +\cdot4626$, $B = -\cdot1963$, $C = -\cdot8646$; $\delta = +7$; $h = -9$;
$D = -\cdot391$, $E = -\cdot920$; $G = -\cdot796$, $H = +\cdot338$, $K = -\cdot502$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Plata	E.	33·8	303	6 11	−35	11 17	−53	7 29	PP	13·8
	N.	33·8	303	6 23	−23	11 29	−41	7 29	PP	15·3
Grahamstown	Z.	41·8	73	i 7 54	+ 1	—	—	—	—	—
Pietermaritzburg	Z.	46·7	74	i 8 33	+ 1	—	—	—	—	—
Pretoria	Z.	48·9	69	i 8 46	− 4	—	—	—	—	—
La Paz		54·3	304	i 9 29k	− 1	i 17 3	− 4	11 43	PP	26·5
Huancayo		61·3	298	i 10 19	− 1	e 18 43	+ 4	e 14 20	PPP	e 25·7
Bogota		75·8	307	i 11 47	− 3	i 21 25	− 6	i 14 35	PP	35·6
Wellington		78·0	193	—	—	e 22 0	+ 5	—	—	e41·6
Fort de France		80·6	323	e 9 53	?	—	—	e 21 9	?	—
San Juan		85·6	319	e 12 39	− 2	e 23 6	[+ 1]	e 32 19	SSS	e 34·5
Tamanrasset	Z.	85·7	26	i 12 44a	+ 2	e 23 6	[+ 1]	e 15 59	PP	—
Riverview		86·4	175	i 12 49k	+ 4	i 23 18	− 3	i 23 29	ScS	e 43·8
Brisbane	..	92·8	176	e 13 17	+ 1	—	—	—	—	—
Granada		98·2	15	i 14 13k	+33	i 25 22	+17	30 46	?	—
Alicante		99·7	17	19 15	PPP	—	—	—	—	e 53·2
Helwan		100·0	45	e 13 51	+ 3	e 24 25	[− 2]	e 17 53	PP	—
Kodaikanal	E.	104·0	93	—	—	e 24 52	[+ 6]	—	—	—
Ksara		105·2	47	e 18 33	PP	—	—	e 30 47	?	—
Rome		105·6	26	e 18 27	PP	e 25 40	{+ 6}	e 27 45	PS	—
Pavia		108·1	23	e 18 52	PP	e 28 26	PS	—	—	e 55·4
Palisades		109·0	321	i 19 1	PP	e 25 12	[+ 4]	e 28 19	PS	—
Bombay		109·1	84	e 18 35?	[+ 4]	—	—	—	—	—
Triest		109·5	26	e 19 1	PP	e 25 14	[+ 4]	e 26 0	SKKS	—
Harvard		109·6	323	e 18 58	PP	—	—	—	—	e 52·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Paris		110·4	17	e 18 22	[−12]	i 24 47	[−27]	e 28 45	PS	e 52·6
Strasbourg		111·1	21	e 19 14	PP	e 28 47	PS	—	—	e 54·6
Stuttgart		111·5	22	e 19 5?	PP	e 29 11	PS	—	—	e 60·6
Kew		112·6	14	e 29 9	PS	e 35 18	SS	e 53 27	Q	e 58·6
Seven Falls	E.	113·7	326	—	—	e 35 35	SS	—	—	48·6
Collmberg	Z.	114·6	23	e 18 42	[0]	—	—	e 19 43	PP	—
Tucson		116·3	289	i 18 47	[+ 1]	—	—	e 29 19	PKKP	—
Copenhagen		118·7	21	—	—	29 57	PS	36 14	SS	63·6
Palomar	Z.	120·1	285	i 18 54	[+ 1]	—	—	—	—	—
Riverside	Z.	120·9	284	i 18 55	[+ 1]	—	—	—	—	—
Pierce Ferry		121·0	289	i 18 56	[+ 1]	—	—	e 28 53	PKKP	—
Boulder City		121·2	288	e 18 57	[+ 2]	—	—	—	—	—
Pasadena	Z.	121·4	284	i 18 56	[+ 1]	—	—	—	—	—
Overton	Z.	121·5	289	i 18 57	[+ 1]	—	—	i 29 4	PKKP	—
China Lake	Z.	122·4	286	i 18 57	[0]	—	—	i 28 55	PKKP	—
Kulyab		123·3	70	e 19 0	[+ 1]	—	—	—	—	—
Stalinabad		123·3	69	i 19 0	[+ 1]	e 26 8	[+ 7]	e 20 43	PP	—
Tinemaha	Z.	123·7	286	i 19 2	[+ 2]	—	—	—	—	—
Obi-garm		123·8	69	e 19 4	[+ 4]	—	—	—	—	—
Fresno	Z.	124·2	285	e 19 2k	[+ 1]	—	—	e 20 49	PP	—
Logan		124·5	294	e 19 1	[0]	e 32 16	PPS	e 20 49	PP	—
Moscow		125·0	36	e 18 59	[− 3]	—	—	—	—	—
Lick	Z.	125·6	283	i 19 5k	[+ 1]	—	—	i 19 31	?	—
Tashkent		125·7	67	i 19 5	[+ 1]	e 27 59	{+ 7}	i 21 0	PP	—
Fergana		126·2	70	e 19 5	[0]	—	—	e 21 3	PP	—
Berkeley	Z.	126·3	283	i 19 6	[+ 1]	—	—	—	—	—
Reno		126·5	287	e 19 7k	[+ 2]	—	—	e 20 59	PP	—
Tchimkent		126·6	66	i 19 5	[0]	—	—	—	—	—
Andijan		126·7	70	19 7	[+ 1]	i 22 25	PKS	e 21 0	PP	—
Mineral	Z.	127·9	286	e 19 8k	[0]	—	—	e 21 14	PP	—
Shasta Dam		128·6	286	e 19 9	[0]	—	—	e 21 17	PP	—
Frunse		129·4	70	19 13	[+ 2]	i 22 36	PKS	—	—	—
Rybach'e		129·8	71	—	—	i 22 37	PKS	—	—	—
Hungry Horse		130·6	298	i 19 12	[− 1]	e 22 35	PKS	e 18 55	?	—
Almata		130·8	71	e 19 15	[+ 1]	i 22 41	PKS	—	—	—
Ili		131·4	71	e 19 14	[− 1]	e 22 39	PKS	—	—	—
Seattle		133·8	292	e 19 20	[+ 1]	e 22 58	PKS	—	—	—
Sverdlovsk		133·8	48	i 19 18	[− 1]	i 22 49	PKS	i 21 48	PP	—
Victoria		135·0	292	i 19 22	[+ 1]	22 53	PKS	—	—	—
Resolute Bay		142·4	335	19 28	[− 7]	e 23 23	PKS	e 22 38	PP	68·2
Irkutsk		150·4	80	19 49	[+ 1]	—	—	23 32	PP	—
Kabansk		151·4	81	19 58	[+ 8]	—	—	—	—	—
College		154·7	305	i 20 2	[+ 8]	e 50 39	SSS	e 23 55	PP	e 71·2
Vladivostok		157·2	127	i 19 58	[+ 1]	e 27 3	[+ 1]	i 20 35	PKP_2	—

Additional readings and notes :—
La Plata N =14m.11s.
La Paz iZ =9m.55s., iPPP =12m.50s., iPS =17m.26s., iScS =19m.2s., iSSS =22m.35s.
Huancayo e =10m.59s.
Bogota iPPPEN =17m.7s., iPS =21m.57s.
San Juan ePP =15m.43s.
Tamanrasset eZ =13m.23s.
Riverview eSSE =29m.2s., eSSN =29m.5s., eQE =35·3m.
Helwan eZ =20m.26s., eN =25m.45s.
Rome eSSN =33m.40s.
Triest ePP =19m.34s., iPS =28m.53s., eSS =34m.56s.
Strasbourg e =29m.5s.
China Lake iPP?Z =20m.36s.
Stalinabad ePS =30m.38s.
Tashkent iPKS =22m.17s.
Reno eZ =19m.29s.
Andijan ePS =31m.13s., eSS =41m.5s.
Mineral iZ =19m.22s.
Shasta Dam i =19m.31s., ePKS =22m.4s.
Seattle e =19m.28s., 20m.21s., 23m.5s., 23m.22s., and 24m.5s.
Sverdlovsk SKSP =31m.33s., SS =39m.29s.
College iPKP =20m.18s., e =32m.23s.
Vladivostok ePP =24m.0s., iPPP =27m.43s., eSKKS =30m.53s., iSKSP =34m.33s., eSS =43m.53s., eSSS =49m.23s.
Long waves were also recorded at Tananarive, Christchurch, Almeria, De Bilt, and Upsala.

Jan. 24d. 6h. 7m. 0s. Epicentre 41°·0N. 143°·3E. Depth of focus 0·015.
(as on 1950, December 21d.).

Intensity V at Sitinohe (Aomori Pref.); IV at Urakawa, Hatinohe, Miyako, Sanbongi, Gonohe, Ozawaguti, Sannohé (Aomori Pref.), Hiroo, Ebetu, Okunakayama, and Kamaisi (Owate Pref.); II-III at Aomori, Morioka, Muroran, Karumai (Iwate Pref.), Watari, and Kinkazan (Miyagi Pref.).
Macroseismic radius >300km. Epicentre 41°·2N. 143°·0E. Depth 40km.

Seismological Bulletin of the Cent. Met. Obs., Japan, for January, 1951 Tokyo, 1951, pp. 14-15 with macroseismic chart.

$A = -·6069$, $B = +·4523$, $C = +·6535$; $\delta = -3$; $h = -2$;
$D = +·598$, $E = +·802$; $G = -·524$, $H = +·391$, $K = -·757$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Urakawa		1·2	342	0 20k	− 5	0 32	−13	—	—	—
Hatinohe		1·4	251	0 22	− 6	0 40	− 8	—	—	—
Miyako		1·7	216	0 31a	0	0 57	+ 3	—	—	—
Aomori		1·9	264	0 25k	− 8	0 47	−11	—	—	—
Kusiro		2·1	22	0 33	− 3	0 47	−16	—	—	—
Morioka		2·1	232	0 33	− 3	1 0	− 3	—	—	—
Mizusawa	E.	2·5	222	0 43	+ 2	1 14	+ 2	—	—	—
Sapporo		2·5	325	0 22a	−19	0 39	−33	—	—	—
Akita		2·8	242	0 40	− 5	1 14	− 5	—	—	—
Nemuro		2·9	44	0 41	− 5	1 8	−13	—	—	—
Abashiro		3·1	13	0 38	−11	—	—	—	—	—
Sendai		3·3	214	0 51	− 1	1 33	+ 2	—	—	—
Sakata		3·4	232	1 49	+56	2 46	+73	—	—	—
Yamagata		3·6	220	1 41	S	(1 41)	+ 3	—	—	—
Hukusima		3·9	214	1 0	+ 1	1 47	+ 2	—	—	—
Inawasiro		4·2	217	1 8	+ 5	2 5	+13	—	—	—
Onahama		4·5	205	1 11	+ 3	2 5	+ 6	—	—	—
Shirakawa		4·6	213	1 10	+ 1	2 4	+ 2	—	—	—
Mito		5·1	206	1 19	+ 3	2 20	+ 6	—	—	—
Utunomiya		5·2	212	1 18	+ 1	2 22	+ 6	—	—	—
Tukubasan		5·4	208	1 20	0	2 23	+ 2	—	—	—
Kumagaya		5·7	213	1 30	+ 6	2 34	+ 6	—	—	—
Maebasi		5·7	217	1 22	− 2	2 37	+ 9	—	—	—
Oiwake		6·0	220	1 39	+11	—	—	—	—	—
Tokyo		6·0	206	1 31	+ 3	2 36	0	—	—	—
Hunatu		6·5	213	1 35	0	2 53	+ 5	—	—	—
Kohu		6·5	216	1 33	− 2	3 2	+14	—	—	—
Misima		6·8	211	1 45	+ 6	2 56	+ 1	—	—	—
Osima		7·0	206	1 46	+ 5	—	—	—	—	—
Nagoya		7·7	222	1 54	+ 3	—	—	—	—	—
College		45·0	35	i 8 1	− 3	—	—	i 8 23	pP	—
Shasta Dam		67·6	55	i 10 45	0	—	—	—	—	—
Hungry Horse		67·9	44	i 10 45	− 2	—	—	—	—	—
Mineral	z.	68·3	55	i 10 49a	0	—	—	—	—	—
Tinemaha	z.	72·3	56	e 11 15	+ 2	—	—	—	—	—
China Lake	z.	73·5	57	e 11 21	+ 1	—	—	—	—	—
Pasadena	z.	74·2	58	e 11 26	+ 2	—	—	—	—	—
Riverside	z.	74·8	58	e 11 28	0	—	—	—	—	—
Overton	z.	75·1	54	i 11 31	+ 1	—	—	—	—	—
Boulder City		75·2	55	i 11 31	+ 1	—	—	—	—	—
Pierce Ferry		75·6	54	i 11 33	+ 1	—	—	—	—	—
Tucson		80·1	56	e 11 58	+ 1	—	—	—	—	—

College gives also i = 8m.9s.

Jan. 24d. 7h. 17m. 4s. Epicentre 33°·2N. 115°·7W. (as on 1950, August 1d.).

Intensity VII around Westmorland; VI at Brawley, Calexico, Calipatria, Coachella, Imperial, Mount Laguna; V at Camp Angelus, Indio, Pine Valley. Macroseismic Area 14000 sq.m. Epicentre 33°7′N. 115°34′W.

L. M. Murphy and W. K. Cloud.
U.S. Earthquakes, 1951, serial No. 762, Washington, 1953, p.p.8-10, with macroseismic chart.

$A = -·3636$, $B = -·7555$, $C = +·5450$; $\delta = +1$; $h = +1$;
$D = -·901$, $E = +·434$; $G = -·236$, $H = -·491$, $K = -·838$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Palomar	Z.	1·0	279	i 0 17 a	− 4	—	—	—	—	—
La Jolla		1·4	256	i 0 22	− 5	i 0 38	− 8	—	—	—
Perris	Z.	1·4	295	i 0 24	− 3	—	—	—	—	—
Riverside		1·5	300	i 0 27 a	− 1	i 0 55	+ 6	—	—	—
Pasadena		2·3	295	i 0 35 a	− 5	i 1 11	+ 2	i 0 41	P*	—
Boulder City		2·8	14	e 0 47	0	—	—	i 0 49	P*	—
Pierce Ferry		3·2	25	i 0 52	0	—	—	—	—	—
Overton	Z.	3·5	18	i 0 56	− 1	—	—	—	—	—
Tucson		4·2	102	i 1 2	− 5	i 1 43	−14	i 1 24	P_g	i 1·8
Fresno		4·9	317	e 1 14k	− 3	e 2 19	+ 4	i 1 24	P*	—
Lick		6·4	312	i 1 34 a	− 4	e 3 6	S*	i 2 17	P_g	—
Santa Clara		6·6	311	e 2 5	P*	i 4 3	+65	—	—	—
Berkeley		7·1	313	e 1 45	− 3	e 3 6	− 4	e 2 1	P*	—
Reno	N.	7·1	334	e 1 50	+ 2	—	—	—	—	—
Salt Lake City		8·2	21	e 2 36	P_g	e 3 30	− 8	—	—	e 4·3
Ukiah		8·5	316	e 3 3	?	e 4 21	S*	—	—	e 4·8
Mineral		8·6	328	i 2 10 a	+ 1	e 3 55	+ 7	—	—	—
Logan		9·1	19	e 2 17	+ 3	—	—	i 3 14	?	i 4·8
Shasta Dam		9·2	326	i 2 22	+ 6	—	—	i 2 43	P*	i 4·8
Ferndale		10·0	320	—	—	e 5 5	S*	e 5 33	S_g	e 5·9
Lubbock		11·6	84	2 42	− 8	6 10	+69	2 50	PP	—
Bozeman		13·0	15	e 3 18	+ 9	e 5 36	+ 1	e 4 11	?	e 6·2
Butte		13·0	10	e 3 13	+ 4	e 5 57	88	—	—	e 6·8
Rapid City	E.	14·6	38	e 3 38	+ 8	i 6 14	+ 1	e 5 36	?	i 6·9
Hungry Horse		15·2	4	i 3 40	+ 2	e 6 42	88	i 45	PP	e 8·1
Seattle		15·3	343	e 3 40 a	+ 1	e 6 26	− 4	i 8 49	PcP	i 9·2
Victoria		16·4	342	3 58	+ 5	—	—	e 8 15	Q	9·1
Lincoln	E.	17·0	57	e 4 5	+ 4	e 6 35	−35	e 5 19	?	e 7·7
Saskatoon		20·0	16	—	—	i 8 33	+16	—	—	10·8
Tacubaya		20·2	128	e 4 43	+ 4	—	—	—	—	e 10·6
St. Louis		21·3	68	i 4 51	+ 1	i 8 55	+12	—	—	—
Chicago		23·8	59	i 5 14	− 1	e 9 36	+ 8	e 5 50	PP	e 12·2
Sitka		27·4	337	—	—	e 10 48	+20	—	—	e 13·6
Cleveland		28·3	63	i 5 59 a	+ 2	e 10 46	+ 3	e 11 52	SS	i 14·8
Columbia		28·8	78	—	—	e 11 1	+10	—	—	e 15·0
Morgantown		29·3	67	i 6 9	+ 3	—	—	—	—	e 15·3
Pittsburgh	Z.	29·4	65	i 5 59	− 8	—	—	—	—	i 15·1
Buffalo		30·4	60	e 11 29	S	(e 11 29)	+13	—	—	i 16·0
Pennsylvania		31·0	64	e 6 14	− 7	e 11 13	−13	e 8 21	?	—
Ottawa		32·9	56	e 6 40	+ 2	e 12 8	+12	e 14 50	Q	i 17·8
Palisades		34·0	65	—	—	e 12 22	+ 9	e 15 16	Q	i 17·8
Shawinigan Falls	N.	35·1	54	e 7 11	+14	—	—	—	—	18·1
Weston		35·9	61	e 7 1	− 3	—	—	—	—	i 18·8
Seven Falls	E.	36·5	54	7 11	+ 2	13 6	+15	8 45	PP	19·0
College		37·2	338	e 7 16	+ 1	—	—	—	—	e 18·2
Resolute Bay		42·8	7	8 0	− 1	14 30	+ 4	e 9 37	PP	20·4
San Juan		46·6	95	i 8 33	+ 1	e 15 19	− 2	—	—	e 25·4
Bogota		48·1	117	i 8 48	+ 5	i 15 51	+ 9	e 10 42	PP	22·9
Huancayo		59·2	132	e 10 8	+ 3	e 18 14	+ 2	—	—	e 25·3
La Paz		67·1	129	e 11 14	+17	e 19 56	+ 5	—	—	33·1

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kew		78·5	35	e 30 58	PKKP	—	—	—	—	e 39·9
Paris		81·5	36	e 12 17?	− 4	i 23 56	PPS	e 15 22	PP	e 42·9
Strasbourg		84·2	34	e 12 36	+ 2	—	—	—	—	e 39·9
Collmberg	z.	84·5	30	e 12 38	+ 2	—	—	—	—	—
Stuttgart		84·8	33	e 12 40	+ 3	—	—	—	—	e 44·9
Almeria		86·6	48	—	—	23 28	+ 5	—	—	41·8
Tamanrasset	z.	101·0	54	—	—	e 24 49	[+17]	—	—	52·9

Additional readings :—
Tucson i = 1m.10s.
Fresno i = 1m.31s.
Lick iN = 1m.59s.
Berkeley eNZ = 2m.15s., eZ = 3m.43s.
Ferndale eEN = 5m.19s.
Seattle ePP = 3m.52s., eSS? = 6m.54s., and many other unidentified readings.
Cleveland eN = 6m.24s., iSE = 10m.56s.
Seven Falls PPPE = 9m.7s.
Resolute Bay e = 17m.31s.
Bogota eSSEN = 19m.23s.
Paris iPP = 15m.18s., ePPP? = 16m.52s., i = 19m.56s.
Long waves were also recorded at Guadalajara, Puebla, Harvard, Halifax, Ivigtut, Scoresby Sund, Copenhagen, Upsala, De Bilt, and Granada.

Jan. 24d. Readings also at 0h. (La Paz), 2h. (Overton), 3h. (Weston), 5h. (Huancayo), 6h. (Ksara, Tchimkent, Samarkand, near Khorog, Dzhergetal, Kulyab, Obi-garm, Fergana, Stalinabad, and Andijan), 7h. (Fresno, Lick, Mineral, Reno, near Boulder City (2), Overton (2), Pierce Ferry, Tucson (2), near Istanbul, near Gandzha, Akhalkalaki, and Stepanavan), 8h. (Pierce Ferry, Pavia, and near Borzhomi), 9h. (Collmberg, near Boulder City, Overton, and Pierce Ferry), 10h. (near Klyuchi), 13h. (College, Overton, Pierce Ferry (2), Shasta Dam, and Collmberg), 14h. (Overton (2), and Pierce Ferry), 15h. and 16h. (Overton), 17h. (Hungry Horse, Tamanrasset, Collmberg, Prague, Ksara, and near Chatra), 18h. (Djakarta, Manila, Riverview, Brisbane, College, Overton, Pierce Ferry (2), China Lake, near Hungry Horse, near Ottawa, near Gandzha, Akhalkalaki, and Tsikhlis-Dzhvari), 19h. (Berkeley, Lick, Mineral, Reno, Pasadena, Riverside, Palomar, China Lake, Tinemaha, Boulder City, Overton, Pierce Ferry, Tucson, Hungry Horse (2), and Tacubaya), 20h. (Resolute Bay, Overton, Pierce Ferry, and near Chilisk), 21h. (Bucharest), 23h. (Apia, College, and Chatra).

Jan. 25d. 16h. 35m. 36s. Epicentre 1°·5S. 81°·5E.

$A = +·1478$, $B = +·9887$, $C = -·0260$; $\delta = +5$; $h = +7$;
$D = +·989$, $E = -·148$; $G = -·004$, $H = -·026$, $K = -1·000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Colombo	N.	8·5	349	1 56	−11	—	—	—	—	3·9
Kodaikanal	E.	12·3	341	e 2 52	− 7	i 5 4	−14	15 50	SeS	—
Hyderabad		19·0	351	i 4 23	− 3	i 8 2	+ 7	8 18	SS	9·9
Poona	E.	21·3	340	i 4 49	− 1	i 8 45	+ 2	9 35	SS	9·2
Bombay	N.	22·0	337	i 4 59	+ 1	i 9 0	+ 4	9 25	Q	10·0
Calcutta	E.	24·8	14	e 5 31	+ 6	i 9 56	+10	10 49	SS	—
Djakarta		25·7	100	i 5 34	+ 1	i 10 16	+15	—	—	—
Chatra		28·7	11	i 6 0	− 1	—	—	e 6 7	P	—
Khorog		39·8	348	e 7 42	+ 6	—	—	—	—	—
Kulyab		40·7	346	e 7 48	+ 4	—	—	e 9 23	PP	—
Obi-garm		41·5	346	e 7 48	− 2	i 13 59	− 8	—	—	—
Stalinabad		41·6	345	i 7 46	− 5	i 13 57	−11	—	—	—
Andijan		42·9	350	8 1	− 1	i 14 20	− 7	—	—	—
Naryn		43·0	355	e 8 8	+ 5	18 6	SSS	—	—	—
Samarkand		43·1	343	e 8 1	− 3	—	—	—	—	—
Rybach'e		44·0	355	e 8 19	+ 8	e 14 42	− 1	—	—	—
Tashkent		44·0	347	i 8 14	+ 3	e 14 41	− 2	—	—	—
Perth		44·3	137	—	—	i 14 52	+ 4	i 18 19	SS	—
Frunse		44·6	353	e 8 24	+ 8	i 14 51	− 1	—	—	—
Ashkabad		44·7	334	e 8 17	+ 1	—	—	—	—	—
Almata		44·8	356	8 24	+ 7	i 14 54	− 1	—	—	—
Tchimkent		44·9	348	i 8 16	− 2	—	—	—	—	—
Ili		45·4	356	e 8 18	− 4	—	—	—	—	—
Nanking		48·6	43	8 53	+ 6	e 15 46	− 3	e 10 49	PP	e 22·9
Tiflis		54·3	327	e 9 28	− 2	e 17 7	0	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Borzhomi		55·2	326	e 9 35?	− 2	—	—	—	—	—
Ksara		55·4	313	i 9 36a	− 2	17 42	PPS	—	—	—
Abastumanj		55·5	326	e 9 47?	+ 8	—	—	—	—	—
Pietermaritzburg	z.	56·0	235	i 9 36	− 7	—	—	—	—	—
Irkutsk		56·9	16	e 10 2?	+13	e 17 39?	− 3	e 21 24?	SS	—
Helwan		57·1	307	e 9 45	− 5	17 39	− 6	10 39	PcP	—
Kabansk		57·4	18	e 9 56	+ 3	—	—	—	—	—
Grahamstown	z.	60·3	232	i 10 36	+23	—	—	—	—	—
Sverdlovsk		60·5	347	e 10 10?	− 4	i 18 24	− 5	i 18 42	PS	—
Vladivostok		63·3	39	e 10 27	− 6	e 20 22	ScS	e 11 20	PcP	—
Istanbul		63·6	318	e 10 32	− 3	e 19 5	− 3	—	—	e 34·4
Kishinev		66·7	324	10 50?	− 5	19 37	− 9	—	—	—
Moscow		67·3	335	e 10 55	− 4	—	—	—	—	—
Messina		72·2	311	e 13 41	?	e 19 57	−54	e 15 11	?	—
Riverview		72·3	125	i 11 25	− 4	i 20 47	− 5	e 21 25	PS	e 33·9
Rome		75·5	314	e 11 44	− 4	e 26 16	SS	e 14 48	PP	—
Triest		75·7	318	—	—	e 24 13	?	—	—	—
Prague		76·6	323	e 12 2	+ 8	—	—	e 14 54	PP	e 43·4
Tamanrasset	z.	77·7	294	i 11 58k	− 2	e 21 12	PS	e 14 24	PP	35·4
Collmberg	z.	77·9	323	e 11 56	− 5	—	—	e 12 12	PcP	—
Jena		78·6	322	e 12 0	− 5	—	—	e 12 9	PcP	—
Pavia		78·7	317	e 27 36	?	—	—	—	—	e 40·8
Stuttgart		79·5	320	e 12 5a	− 5	e 22 36	+25	e 12 16	PcP	46·4
Strasbourg		80·4	320	e 12 10	− 5	e 27 30	SS	e 34 18	Q	e 41·4
Besançon		81·3	318	e 12 15	− 5	—	—	e 12 26	PcP	—
Algiers Univ.	z.	81·7	307	i 12 18a	− 4	—	—	—	—	—
Paris		83·9	319	i 12 29	− 4	—	—	e 17 31	PPP	e 47·4
Kew		86·1	321	—	—	e 23 16	− 2	e 29 15	SPS	e 46·4
Resolute Bay		106·9	358	—	—	24 54	[− 5]	—	—	—
College		107·6	20	e 18 37	[+ 9]	e 28 18	PS	e 29 50	PKKP	e 44·5
Hungry Horse		131·4	13	e 19 10	[− 5]	—	—	—	—	—
Palisades		134·8	333	—	—	e 45 2	SSS	—	—	—
Shasta Dam		135·4	26	e 19 7	[−15]	—	—	—	—	—
Mineral	z.	136·0	25	e 20 22k	[+59]	—	—	e 22 12	PP	—
Lick	z.	138·4	28	i 19 24k	[− 4]	—	—	e 19 35	PKP	—
China Lake	z.	141·5	25	e 19 25	[− 8]	e 23 22	PKS	e 19 41	PKP	—
Overton	z.	142·2	21	e 19 29	[− 5]	—	—	—	—	—
Boulder City		142·5	21	e 19 29	[− 6]	—	—	—	—	—
Pasadena	z.	142·7	27	e 19 30	[− 5]	—	—	e 19 44	PKP	—
Pierce Ferry		142·7	20	e 19 29	[− 6]	—	—	—	—	—
Riverside	z.	143·2	27	e 19 29	[− 7]	—	—	e 19 48	PKP	—
Palomar	z.	143·9	26	i 19 33	[− 4]	—	—	i 19 48	PKP	—
San Juan		144·1	300	i 19 32	[− 6]	—	—	e 17 26	?	—
La Paz		145·1	239	i 19 35	[− 4]	i 29 48	(− 3)	41 44	SS	—
Tucson		147·3	19	e 19 42	[− 1]	—	—	i 20 0	PKP,	—
Huancayo		153·3	239	e 19 59	[+ 7]	e 43 24	SS	e 49 16	SSS	e 66·8

Additional readings :—
Kodaikanal PcSE =12m.16s.
Calcutta PPE =6m.9s., PcPE =9m.8s., SSSE =11m.22s., PcSE =12m.42s., ScSE = 16m.16s.
Irkutsk ePP =12m.6s.?.
Helwan eZ =10m.27s. and 13m.19s., eN =19m.36s.
Vladivostok iPS =18m.59s.
Riverview iZ =15m.39s., eE =20m.39s., iN =20m.59s., eSS?E =25m.52s., eSSS?E = 29m.6s.
Rome eE =18m.24s. and 21m.4s.
Tamanrasset ePcSZ =15m.16s.
Stuttgart ePcPZ =12m.13s., e =27m.12s., eQ =42·9m.
Strasbourg e =12m.52s.
Besançon e =12m.50s.
Paris e =16m.7s., i =37m.55s.
College e =18m.49s., eSS =34m.35s.
La Paz i =19m.56s. and 20m.14s.
Tucson ePKS =24m.37s.
Huancayo eSKSP =34m.12s., e =37m.0s.
Long waves were also recorded at Ottawa, Seven Falls, Harvard, Christchurch, De Bilt, Copenhagen, and Upsala.

Jan. 25d. Readings also at 0h. (Naryn, Fergana, near Dzhergetal, Khorog, Andijan, Stalinabad, and Kulyab), 3h. (Tamanrasset, Collmberg, Stuttgart, Prague, Istanbul, Helwan, Ksara, and Djakarta), 4h. (College, Hungry Horse, Pierce Ferry, La Paz, Ashkabad, Kulyab, near Dzhergetal, and Khorog), 5h. (China Lake and Tucson), 7h. (near Kulyab), 8h. (Dzhergetal, Andijan, near Obi-garm, Khorog, and Stalinabad), 9h. (Tucson, College, and Hungry Horse), 10h. (New Delhi), 11h. (Tacubaya and Overton), 12h. (Ksara, Tamanrasset, Saskatoon, La Paz, Pasadena, Overton, Tinemaha, Riverside, Boulder City, Shasta Dam, Pierce Ferry, China Lake, Tucson, Lick, Hungry Horse, Mineral, and Weston), 13h. (Pierce Ferry, Overton, and Apia), 14h. (Apia and near Balboa Heights), 15h. (Brisbane, Wellington, Kaimata, Tamanrasset (2), Collmberg (3), Stuttgart, Pasadena, Palomar, Fresno, Tinemaha, Riverside, Shasta Dam, China Lake, Tucson, Hungry Horse, Mineral, Pierce Ferry, Overton, Lick, Weston, and College), 16h. (Hungry Horse), 17h. (Mount Wilson, Riverside, Boulder City, Shasta Dam, China Lake, Pierce Ferry, Overton, and College (2)), 18h. (near Istanbul), 20h. (Pasadena, Riverside, China Lake, Pierce Pierce Ferry, Overton, Rybach'e, Fergana, Frunse, Ili, Krasnogorka, Kurmenty, Chilisk, near Naryn, and Andijan), 21h. (Shasta Dam, Santa Clara, and near Istanbul), 22h. (Apia).

Jan. 26d. 3h. 25m. 16s. Epicentre 1°·5N. 126°·0E. (as on 1947, Nov. 25d.).

$A = -\cdot5876$, $B = +\cdot8088$, $C = +\cdot0260$; $\delta = +11$; $h = +7$;
$D = +\cdot809$, $E = +\cdot588$; $G = -\cdot015$, $H = +\cdot021$, $K = -1\cdot000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		13·9	339	e 3 11	−10	e 6 46	SSS	—	—	—
Bandong		20·1	246	e 4 23	−15	e 7 53	−26	—	—	—
Djakarta		20·6	249	e 4 44	+ 1	e 8 30	+ 1	—	—	—
Vladivostok		41·8	7	i 7 56	+ 3	14 17	+ 6	—	—	—
Riverview		42·4	149	e 7 49	− 9	e 14 0	−20	i 17 18	SS	e 19·6
Colombo	N.	46·3	278	8 31	+ 2	15 19	+ 3	—	—	25·7
Hyderabad		49·3	292	e 8 48	− 5	15 51	− 8	—	—	—
Irkutsk		53·7	344	9 30	+ 4	e 17 7	+ 8	—	—	—
Bombay	N.	54·9	292	e 9 33	− 2	e 17 5	−11	—	—	—
Naryn		60·0	319	i 10 22	pP	—	—	—	—	—
Rybach'e		60·4	320	e 10 17	+ 4	—	—	—	—	—
Ili		60·5	322	e 10 12	− 2	—	—	—	—	—
Khorog		61·4	312	e 10 20	0	—	—	—	—	—
Frunse		61·6	319	e 10 24	+ 2	—	—	—	—	—
Andijan		62·1	316	e 10 24	− 1	—	—	e 10 57	PcP	—
Fergana		62·4	316	e 10 25	− 2	—	—	—	—	—
Kulyab		62·9	313	e 10 34	+ 4	—	—	—	—	—
Obi-garm		63·2	313	i 10 32	0	e 19 0	− 3	—	—	—
Stalinabad		63·9	313	10 35	− 2	19 5	− 7	—	—	—
Lunacharskoe		64·5	316	e 10 59	pP	—	—	—	—	—
Tashkent		64·5	316	10 41	0	e 19 15	− 4	—	—	—
Tchimkent		64·7	317	10 42	0	—	—	—	—	—
Samarkand		65·6	313	e 10 42	− 6	—	—	—	—	—
Mary		68·8	310	e 11 8	0	—	—	—	—	—
Sverdlovsk		75·5	330	i 11 48	0	i 21 26	− 2	—	—	—
Lenkoran		79·1	309	i 12 7	− 1	22 19	+12	15 16	PP	—
Tiflis		82·4	312	e 12 25	0	—	—	—	—	—
Borzhomi		83·0	312	e 12 31	+ 3	—	—	—	—	—
Abastumanj		83·9	312	e 12 33	0	—	—	—	—	—
College		87·0	25	e 12 46	− 2	e 22 53	[−21]	e 16 19	PP	e 36·9
Moscow		87·9	326	e 12 57	+ 4	e 23 34	− 1	—	—	—
Ksara		89·3	303	i 12 58a	− 1	24 0	+12	—	—	—
Collmberg	z.	103·0	323	e 14 0	− 2	—	—	e 18 16	PP	—
Shasta Dam		105·2	47	e 14 10	− 2	—	—	e 17 49	PKP	—
Stuttgart	z.	106·2	322	e 18 24	[− 1]	—	—	e 17 19	?	—
Hungry Horse		108·3	38	e 14 23	P	—	—	e 29 32	PKKP	—
China Lake	z.	110·3	51	e 14 24	P	—	—	e 19 16	PP	—
Pasadena		110·3	53	e 18 32	[− 2]	—	—	—	—	e 54·8
Riverside	z.	111·5	53	e 19 15	PP	—	—	—	—	—
Palomar	z.	111·6	53	e 19 28	PP	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Boulder City		112·3	50	e 18 38	[0]	—	—	—	—
Overton	z.	112·4	49	e 18 39	[+ 1]	—	—	e 29 33 PKKP	—
Pierce Ferry		112·9	49	i 18 39	[0]	—	—	e 14 48 P	—
Tucson		116·7	52	e 18 45	[− 1]	—	—	e 29 13 PKKP	—
Tamanrasset	z.	117·3	297	e 18 46	[− 1]	e 32 58 PKKS		e 29 8 PKKP	—
Huancayo	z.	156·4	117	e 19 54	[− 2]	—	—	—	—
San Juan		156·9	30	i 20 28	PKP_2	—	—	—	—

Additional readings :—
Riverview eE =16m.52s.
College eSS =30m.7s., ePKKP =31m.33s.
Collmberg eZ =17m.18s.
Stuttgart eZ =18m.48s. and 21m.9s.
China Lake ePKKP?Z =29m.32s.
Pierce Ferry iPKKP =29m.31s.
Tucson ePP =19m.52s., e =22m.8s.
Long waves were also recorded at De Bilt, Kew, Rome, and La Paz.

Jan. 26d. 10h. 37m. 42s. Epicentre 37°·2N. 140°·1E.

Intensity V at Tanakura (Hukusima Prefecture); IV at Onahama and Utunomiya; II-III at Hukusima, Mito, Shirakawa, and Tukubasan. Epicentre as adopted.

Seismo. Bull. Cent. Met. Obs., Japan. Tokyo, 1951, p.15, with chart of intensities.

$A = -·6126$, $B = +·5122$, $C = +·6020$; $\delta = +3$; $h = -1$;
$D = +·641$, $E = +·767$; $G = -·462$, $H = +·386$, $K = -·798$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Shirakawa	0·1	132	0 33	?	—	—
Inawasiro	0·4	2	0 10	− 3	0 20	− 1
Hukusima	0·6	28	0 15a	0	0 26	0
Onahama	0·7	113	0 15	− 2	0 27	− 1
Utunomiya	0·7	196	0 18a	+ 1	0 32	+ 4
Mito	0·9	160	0 19	− 1	0 34	0
Tukubasan	1·0	180	0 21	0	0 47	+11
Sendai	1·2	31	0 21	− 3	0 35	− 6
Titibu	1·5	214	0 49	S	(0 49)	0
Nagano	1·6	251	0 32	+ 2	1 9	+18
Tyosi	1·6	157	0 48	S	(0 48)	− 3
Yokohama	1·8	192	0 54	S	(0 54)	− 2
Kohu	2·0	218	0 38	+ 3	1 0	− 2
Matumoto	2·0	241	1 2	S	(1 2)	0
Mizusawa	2·1	23	0 34	− 3	0 56	− 8
Mera	2·3	185	0 59	S	(0 59)	−10
Misima	2·3	204	0 45	+ 5	1 10	+ 1
Akita	2·5	0	0 41	− 2	1 10	− 4
Osima	2·5	193	0 41	− 2	1 11	− 3
Morioka	2·6	18	0 39	− 5	1 8	− 9
Miyako	2·8	31	0 42	− 5	1 12	−10
Omaesaki	3·0	210	1 41	S_g	—	—
Nagoya	3·2	231	1 8	P_g	1 56	S_g
Gihu	3·3	236	1 7	P_g	—	—
Kameyama	3·8	232	1 46	S	(1 46)	− 1

Jan. 26d. Readings also at 1h. (Chatra and near Chilisk), 2h. (Bogota, Huancayo, La Paz, and Tucson (2)), 3h. (La Paz, Mount Wilson, Palomar, Riverside, China Lake, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Resolute Bay, Tamanrasset, near Khorog, near Harvard, Weston, and Palisades), 4h. (Ashkabad, Huancayo, Palomar, China Lake, Tucson, Pierce Ferry (2), Shasta Dam (2), Hungry Horse (2), and College (2)), 6h. (Boulder City, Overton, and Shasta Dam), 8h. (Nanking, Shasta Dam, College, and Hungry Horse), 9h. (Chilisk, near Fergana, and near Huancayo), 11h. (Pierce Ferry, Fergana, near Andijan, Dzhergetal, Kulyab, and Obi-garm), 12h. (Tucson, Boulder City, Overton, Pierce Ferry, Hungry Horse, College, Andijan, Frunse, Samarkand, near Khorog, Kulyab, Obi-garm, and Stalinabad), 14h. (Apia (2), Lick, Ksara, Khorog, Kulyab, near Dzhergetal, Obi-garm, and near Istanbul), 15h. (Tacubaya, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Boulder City, Overton, Pierce Ferry, Lick, Fresno, Reno, Mineral, Shasta Dam, Hungry Horse, Victoria, College (2), and Resolute Bay), 16h. (Manila, Tucson, Hungry Horse, College (2), and Ottawa), 17h. (Mount Wilson, Palomar, China Lake, Pierce Ferry (2), College, Khorog, and near Manila), 18h. (near Kurmenty), 20h. (Khorog), 21h. (Ashkabad, Pierce Ferry, and College), 22h. (Collmberg and Tucson), 23h. (Andijan, Samarkand, near Khorog, Kulyab, Obi-garm, and Stalinabad).

Jan. 27d. 0h. 36m. 30s. Epicentre 28°·0S. 63°·5W. Depth of focus 0·080.
(as on 1950, Aug. 14d.).

A = +·3946, B = −·7914, C = −·4670 ; δ = +11 ; h = +2 ;
D = −·895, E = −·446 ; G = −·208, H = +·418, K = −·884.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Plata	E.	8·4	147	1 54	− 8	3 6	−34	—	—	3·7
	N.	8·4	147	2 12	+10	3 42	+ 2	3 0	?	4·0
La Paz		12·2	338	i 2 45	+ 4	i 4 58	+ 8	3 22	PP	—
Huancayo		19·4	324	—	—	e 7 6	+ 8	—	—	—
Bogota		34·0	342	i 6 0	0	e 10 48	0	i 10 39	S	—
San Juan		46·2	358	i 7 35	− 3	i 13 44	− 1	i 9 0	PP	—
Tacubaya		58·4	321	e 9 9	+ 3	—	—	—	—	—
Palisades		69·3	353	i 10 14	− 1	—	—	—	—	—
Weston		70·4	355	i 11 21	+60	—	—	—	—	—
Harvard		70·5	355	i 10 22	0	—	—	—	—	—
Ottawa	z.	73·9	352	i 10 41	0	—	—	—	—	—
Tucson		74·9	320	i 10 47	0	—	—	—	—	—
Palomar	z.	79·2	318	i 11 11k	+ 1	—	—	e 13 9	pP	—
Pierce Ferry		79·6	321	i 11 12	0	i 20 33	+ 3	—	—	—
Boulder City		79·9	320	e 11 15	+ 1	—	—	—	—	—
Riverside	z.	80·0	317	i 11 14k	0	—	—	i 13 12	pP	—
Overton	z.	80·1	321	i 11 16	+ 1	e 21 30	pS	i 13 11	pP	—
Pasadena		80·6	317	i 11 17k	0	—	—	i 13 17	pP	—
China Lake	z.	81·4	319	i 11 21k	0	—	—	e 13 20	pP	—
Tinemaha	z.	82·7	319	i 11 28k	0	—	—	e 13 28	pP	—
Fresno	z.	83·3	318	e 11 30k	− 1	—	—	—	—	—
Tamanrasset	z.	83·5	60	i 11 31a	− 1	e 22 1	SP	i 13 31	pP	—
Lick	z.	84·8	317	i 11 39k	+ 1	—	—	e 13 38	pP	—
Reno		85·2	320	e 11 42k	+ 2	e 21 28	+ 3	e 13 38	pP	—
Berkeley	z.	85·6	317	i 11 42k	0	—	—	—	—	—
Mineral	z.	86·8	320	e 11 47k	− 1	—	—	—	—	—
Shasta Dam		87·5	320	e 11 50	− 1	—	—	—	—	—
Hungry Horse		88·4	329	i 11 55	0	—	—	—	—	—
Algiers Univ.	z.	89·8	48	i 12 1k	− 1	—	—	—	—	—
Stuttgart	z.	100·1	41	e 12 47	− 2	—	—	—	—	—
College		112·6	333	e 13 43	P	—	—	e 17 33	PKP	—

Additional readings :—
La Paz ipP = 2m.54s., i = 5m.10s., iSS = 5m.58s.
Tamanrasset eZ = 11m.45s., isPZ = 14m.21s., iPPZ = 14m.59s.
Lick iZ = 11m.50s.
Reno eZ = 12m.4s. and 12m.26s.
Berkeley eZ = 11m.49s. and 11m.55s.
Shasta Dam e = 12m.0s.
College ePP = 18m.15s., i = 18m.36s.

Jan. 27d. 11h. 17m. 12s. Epicentre 13°·5N. 142°·0E.

A = −·7665, B = +·5989, C = +·2320 ; δ = +3 ; h = +6 ;
D = +·616, E = +·788 ; G = −·183, H = +·143, K = −·973.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vladivostok		30·8	345	e 6 33	+13	i 11 34	+11	—	—	—
Riverview		47·9	169	i 10 29	PP	—	—	—	—	i 25·0
Irkutsk		49·0	330	e 8 54	+ 4	e 16 2	+ 7	—	—	—
Frunse		64·4	311	e 10 40	0	—	—	—	—	—
Andijan		65·9	308	e 10 49	− 1	e 19 44	+ 7	—	—	—
Fergana		66·3	308	e 10 51	− 1	—	—	—	—	—
Kulyab		67·9	305	e 11 1	− 1	—	—	—	—	—
Obi-garm		67·9	307	e 11 5	+ 3	—	—	—	—	—
Tchimkent		68·0	310	e 11 3	0	—	—	—	—	—
Tashkent		68·3	309	i 11 5?	0	—	—	—	—	—
Stalinabad		68·6	307	e 11 6	− 1	—	—	—	—	—
College		69·5	25	i 11 11	− 1	—	—	—	—	e 31·5
Sverdlovsk		74·1	326	i 11 41	+ 1	e 21 19?	+7	—	—	—
Resolute Bay		85·3	13	12 42	+ 2	—	—	(e 29 6)	SS	e 29·1
Shasta Dam		85·5	49	i 12 38	− 3	—	—	—	—	—
Mineral	z.	86·2	49	i 12 43 a	− 1	—	—	—	—	—
Lick	z.	86·9	52	e 12 47 a	− 1	—	—	—	—	—
Reno	z.	87·7	49	e 12 51 k	− 1	—	—	—	—	—
Hungry Horse		89·1	40	e 12 59	+ 1	—	—	—	—	—
China Lake	z.	89·6	52	i 13 4	+ 3	—	—	—	—	—
Tinemaha	z.	89·6	51	i 13 0	− 1	—	—	—	—	—
Pasadena	z.	90·5	55	e 13 3	− 2	—	—	—	—	—
Riverside	z.	91·1	55	e 13 6	− 2	—	—	—	—	—
Palomar	z.	91·7	55	e 13 11	+ 1	—	—	—	—	—
Overton	z.	92·6	51	e 13 14	− 1	—	—	—	—	—
Pierce Ferry		93·1	51	i 13 17	0	—	—	—	—	—

Additional readings :—
Riverview iE = 13m.48s., eLE = 14m.30s., iZ = 18m.2s., iEZ = 24m.5s., given as two shocks.
College i = 11m.59s.
Shasta Dam e = 19m.55s.
Mineral iZ = 12m.48s.
Lick iZ = 12m.53s.

Jan. 27d. Readings also at 0h. (College, Tamanrasset, Frunse, Naryn, near Chilisk, and near Ashkabad), 1h. (Chatra), 2h. (Merida, Tacubaya, Vera Cruz, Tucson, Pierce Ferry, College (2), near Akhalkalaki, Gandzha, and Tsikhlis-Dzhvari), 3h. and 5h. (Apia), 6h. (Overton, near Pierce Ferry, Akhalkalaki, Borzhomi, Gandzha, and Tsikhlis-Dzhvari), 7h. (Lick), 8h. (Fergana, Kkorog, near Chilisk, Frunse, and Krasnogorka), 9h. (Apia and near Scoresby Sund), 10h. (Stuttgart, China Lake, Boulder City, Tucson, near Christchurch, Cobb River, and Kaimata), 12h. (Chatra,) 13h. (Tucson, Boulder City, Overton, Pierce Ferry, Lick (2), Reno, Mineral, Hungry Horse, and College), 14h. (Pierce Ferry, Chatra, and near Istanbul), 15h. (College, Almata, Andijan, Ili, Naryn. Tchimkent, and near Kurmenty), 16h. (College, near Manila, and near Kurmenty), 17h. (Pierce Ferry (2), and College (2)), 18h. (Lick), 20h. (Apia, Palomar, China Lake, Tinemaha, Tucson, Overton, Pierce Ferry, near Istanbul, near Akhalkalaki, Stepanavan, Gandzha, and Kurmenty), 21h. (Apia, Andijan, Samarkand, Tashkent, near Fergana, Khorog, Kulyab Obi-garm, and Stalinabad), 22h. (Pierce Ferry, College, Fergana, Frunse, Kulyab, Rybach'e, Stalinabad, near Andijan, Khorog, Naryn, and Obi-garm), 23h. (Samarkand, near Khorog, Kulyab, Obi-garm, and Istanbul).

Jan. 28d. 10h. 0m. 11s. Epicentre 36°·7N. 141°·2E. Focus at base of superficial layers.
(as on 1949, June 1d.).

Intensity IV at Wakamatsu and Hukushima; II-III at Onahama, Mito, Shirakawa, and Inawashiro. Epicentre 36°·6N. 141°·2E. Focal depth 40km.

Seismo. Bull, Cent. Met. Obs., Japan for 1951, Tokyo, 1951, p.16, with macroseismic chart.

$A = -·6263$, $B = +·5036$, $C = +·5951$; $\delta = +1$; $h = -1$;
$D = +·627$, $E = +·779$; $G = -·464$, $H = +·373$, $K = -·804$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Onahama		0·3	314	0 8k	0	0 15	0	—	—	—
Mito		0·7	242	0 11k	− 2	0 20	− 3	—	—	—
Shirakawa		0·9	298	0 15	− 1	0 27	− 1	—	—	—
Tukubasan		1·0	241	0 16	− 2	0 28	− 3	—	—	—
Utunomiya		1·1	262	0 16	− 3	0 29	− 4	—	—	—
Hukusima		1·2	331	0 19a	− 1	0 35	− 1	—	—	—
Inawasiro		1·2	315	0 20	0	0 36	0	—	—	—
Kumagaya		1·6	247	0 35	+ 9	—	—	—	—	—
Tokyo		1·6	229	0 23	− 3	0 42	− 4	—	—	—
Sendai		1·6	351	0 25	− 1	0 47	+ 1	—	—	—
Titibu		1·8	247	—	—	0 48	− 3	—	—	—
Maebasi		1·8	260	0 32	+ 3	0 49	− 2	—	—	—
Mera		2·1	212	—	—	1 0	+ 1	—	—	—
Hunatu		2·3	239	0 29	− 7	1 3	− 1	—	—	—
Osima		2·4	217	0 42	+ 4	—	—	—	—	—
Misima		2·4	225	0 44	+ 6	1 8	+ 2	—	—	—
Mizusawa	E.	2·4	359	1 9	S	(1 9)	+ 3	e 1 24	?	—
Matumoto		2·6	260	—	—	1 12	+ 1	—	—	—
Morioka		3·0	0	0 45	− 1	1 26	+ 4	—	—	—
Miyako		3·0	12	0 56	+10	1 25	+ 3	—	—	—
Nagoya		3·8	247	1 13	+15	—	—	—	—	—

Jan. 28d. 10h. 20m. 8s. Epicentre 36°·9N. 70°·8E. Depth of focus 0·010.
(as on 1948, Nov. 20d.).

Bulletin of the U.S.S.R. gives Epicentre 36°·7N. 71°·1E. Depth = 80km.

$A = +·2636$, $B = +·7570$, $C = +·5978$; $\delta = -10$; $h = -1$;
$D = +·944$, $E = -·329$; $G = +·197$, $H = +·565$, $K = -·802$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Khorog		0·9	48	i 0 16	− 3	0 29	− 5
Kulyab		1·3	321	i 0 25	+ 1	i 0 45	+ 3
Obi-garm		2·2	335	i 0 38	+ 2	i 1 7	+ 5
Stalinabad		2·3	316	i 0 40	+ 3	i 1 12	+ 7
Fergana		3·6	12	i 0 55	0	e 1 40	+ 3
Andijan		4·0	17	i 1 2	+ 2	1 50	+ 4
Samarkand		4·1	314	i 1 5	+ 3	i 1 58	+ 9
Tashkent		4·6	346	i 1 11	+ 2	e 2 4	+ 3
Lunacharskoe		4·6	346	e 1 10	+ 1	i 2 6	+ 5
Tchimkent		5·5	351	i 1 23	+ 2	2 30	+ 7
Naryn		6·1	40	e 1 28	− 1	2 41	+ 3
Frunse		6·6	25	i 1 36	0	—	—
Rybach'e		6·9	35	1 38	− 2	—	—
Mary		7·2	279	i 1 43	− 1	—	—
Almata		7·9	35	i 1 51	− 3	—	—
Ili		8·6	32	e 1 57	− 6	—	—
New Delhi		9·9	145	i 2 22	+ 1	4 4	− 7
Ashkabad		9·9	280	2 21	0	—	—
Tiflis		20·7	291	4 37?	+ 3	e 8 28?	+13
Sverdlovsk		21·1	244	e 4 39	+ 1	—	—
Collmberg	z.	42·8	309	e 7 52	+ 2	—	—
Stuttgart	z.	45·5	306	e 8 13	+ 2	—	—
Tamanrasset	z.	57·3	277	e 9 38	− 2	—	—
College		74·2	17	e 11 23	− 5	—	—

New Delhi also gives ePEN = 2m.3s., iSEN = 3m.43s., SSE = 3m.54s.

Jan. 28d. 13h. 26m. 28s. Epicentre 24°·3N. 122°·3E. (as on 1948, Oct. 23d.).

$A = -·4876$, $B = +·7713$, $C = +·4092$; $\delta = +10$; $h = +4$;
$D = +·845$, $E = +·534$; $G = -·219$, $H = +·346$, $K = -·912$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei		6·9	354	e 1 40	− 5	3 24	S*	1 52	P	3·6
Nanking		8·3	339	e 1 59	− 5	3 33	− 7	2 6	P	e 3·7
Manila		9·7	187	e 2 29	+ 7	e 4 27	+12	—	—	—
Vladivostok		20·4	22	i 4 34	− 7	i 8 20	− 5	—	—	—
Irkutsk		31·1	338	e 6 18	− 4	—	—	—	—	—
Calcutta	E.	31·2	274	e 9 16	PcP	e 13 50	SSS	14 52	Q	16·2
Chatra		31·7	283	e 6 36	+ 9	—	—	—	—	—
New Delhi	N.	40·4	287	e 7 37	− 4	e 13 49	− 1	16 44	SS	—
Kurmenty		40·6	310	i 7 43	0	—	—	—	—	—
Hyderabad	N.	41·4	269	—	—	17 55	SSS	—	—	—
Almata		41·6	309	e 7 51	0	—	—	—	—	—
Naryn		41·9	307	i 7 54	0	—	—	—	—	—
Frunse		43·2	308	e 8 7	+ 3	—	—	—	—	—
Andijan		44·6	304	8 16	0	—	—	—	—	—
Fergana		45·0	304	e 8 18	− 1	—	—	—	—	—
Poona	E.	45·3	273	8 26	+ 5	e 14 56	− 6	—	—	—
Bombay	N.	46·1	274	e 8 32?	+ 4	e 15 30	PPS	—	—	—
Kulyab		46·4	299	e 8 36	+ 6	—	—	—	—	—
Obi-garm		46·5	302	e 8 32	+ 1	—	—	—	—	—
Tchimkent		46·8	306	i 8 33	0	—	—	—	—	—
Tashkent		46·9	305	e 8 35	+ 1	e 15 30?	+ 5	—	—	—
Lunacharskoe		46·9	305	e 8 45?	+11	—	—	—	—	—
Stalinabad		47·2	301	e 8 34	− 2	—	—	—	—	—
Sverdlovsk		54·6	324	e 9 33	+ 1	17 11	0	—	—	—
Ashkabad		55·4	300	9 38	0	—	—	—	—	—
Moscow		67·4	323	e 11 5	+ 6	e 20 26	PS	—	—	—
College		68·2	27	e 11 0	− 4	e 21 38	ScS	—	—	e 27·6
Ksara		74·1	300	e 11 11	−29	—	—	—	—	—
Scoresby Sund		82·2	348	e 12 26	+ 2	—	—	—	—	40·5
Prague		82·4	322	e 13 16	+51	—	—	e 36 32	Q	41·5
Collmberg	Z.	82·6	323	e 12 28	+ 2	—	—	—	—	—
Stuttgart		86·0	322	e 12 50?	+ 7	e 23 32	+15	e 24 52	PPS	e 46·5
Strasbourg		86·9	323	30 55?	?	—	—	—	—	e 44·5
Rome	E.	87·6	316	e 36 1	?	—	—	—	—	e 47·6
Paris		89·6	325	i 39 42	P′P′	—	—	e 42 37	Q	e 47·5
Rathfarnham Castle		90·8	332	e 37 39	?	—	—	—	—	e 44·5
Shasta Dam		91·8	44	e 13 7	− 4	—	—	—	—	—
Hungry Horse		91·9	34	e 13 9	− 2	—	—	—	—	—
Mineral	Z.	92·5	44	e 13 11k	− 3	—	—	i 13 15	P	—
Berkeley	Z.	93·4	46	e 13 20	+ 2	—	—	—	—	—
Lick	Z.	94·1	46	e 13 24k	+ 2	—	—	—	—	—
Reno	Z.	94·1	43	e 13 17	− 5	—	—	—	—	—
Tinemaha	Z.	96·5	45	e 13 29	− 3	—	—	—	—	—
China Lake	Z.	97·7	45	e 13 33	− 5	—	—	e 18 25	PP	—
Pierce Ferry		99·8	43	e 14 0	+13	—	—	—	—	—
Tamanrasset	Z.	102·8	303	e 18 22	PP	—	—	—	—	—

Additional readings :—
Calcutta PPE =9m.54s., SSE =15m.18s.
Ksara e =23m.16s.
Collmberg eZ =12m.57s.
Stuttgart eZ =13m.11s.
Hungry Horse e =14m.55s.
Lick eZ =13m.41s.
Long waves were also recorded at Christchurch, Upsala, Pavia, Triest, Potsdam, Copenhagen, Kew, Aberdeen, Helsinki, and Alicante.

Jan. 28d. Readiings also at 1h. (Tucson), 2h. (Tucson, Hungry Horse, Shasta Dam, College, near Akhalkalaki, Stepanavan, and Gandzha), 3h. (Lick, Reno, Mineral, Mount Wilson, Riverside, China Lake, Tinemaha, Hungry Horse, Shasta Dam, College, near Apia, Irkutsk, Kulyab, Stalinabad, and Sverdlovsk), 4h. (near Lenkoran), 5h. (Cleveland), 7h. (Ksara and Ashkabad), 8h. (Apia, Riverside, China Lake, Tinemaha, Pasadena, Overton, Pierce Ferry, and Resolute Bay), 9h. (Apia, near Kulyab, Stalinabad, Obi-garm, and Khorog), 11h. (Tucson, near Tacubaya (2), Puebla, and Vera Cruz), 13h. (La Paz), 17h. (near Naryn), 18h. (near Obi-garm, Puebla, Vera Cruz, and near Tacubaya), 19h. (Kulyab, Rybach'e, Frunse, near Andijan, Fergana, Naryn, Obi-garm, and Ili), 20h. (College, Tacubaya, and Puebla), 21h. (College), 23h. (Manila, College, Boulder City, Pierce Ferry, Overton, near Tucson, near Chur, near Ashkabad, and near Kurmenty).

Jan. 29d. 0h. 46m. 3s. Epicentre 47°·2N. 10°·8E. (as on 1950, Oct. 24d.).

Intensity V-VI at Tarrenz; V at Chur; IV at Churwalden and Malix. Macroseismic ares 1000sq.km.

Jahrbucher der Zentralanstalt für Meteorologie und Geodynamik, Jahrgang, 1951, neue Folge, vol 88, Vienna, 1952, pp.E1-E2, with macroseismic chart p.E3.

E. Wanner.
Jahresbericht des Erdbebendienstes der Schweiz im Jahre, 1951, Zürich, 1952, p.2.

$A = +·6698$, $B = +·1278$, $C = +·7314$; $\delta = -9$; $h = -4$;
$D = +·187$, $E = -·982$; $G = +·718$, $H = +·137$, $K = -·682$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Chur		0·9	248	e 0 19	− 1	i 0 26	− 8	e 0 32	S	—
Ravensburg		1·0	306	e 0 17?	− 4	e 0 35	− 1	—	—	—
Zürich		1·5	276	e 0 27	− 1	e 0 47	− 2	—	—	—
Stuttgart		1·9	326	e 0 30	− 4	i 0 59	0	e 0 33	P	—
Basle		2·2	279	e 0 41	+ 3	e 1 10	+ 4	—	—	—
Strasbourg		2·5	304	e 0 45	+ 2	—	—	—	—	e 1·4
Besançon		3·3	271	—	—	e 1 45	S_g	—	—	—
Jena		3·8	8	e 1 28?	P_g	e 1 55	+ 8	e 2 3	S_g	—
Prague		4·2	39	—	—	e 1 39	−18	e 2 2	S	—
Collmberg	z.	4·4	19	—	—	e 2 15	S*	e 2 29	S_g	—

Additional readings :—
Chur i = 37s.
Ravensburg eZ = 25s., e = 32s. and 34s.
Stuttgart eS?Z = 49s., eS*Z = 56s., iS_gZ = 1m.2s.
Jena eN = 1m.58s.
Prague eS* = 1m.53s.
Long waves were also recorded at Ksara.

Jan. 29d. 4h. 22m. 45s. Epicentre 7°·5S. 129°·0E. Depth of focus 0·020.
(as on 1950, Nov. 2d.).

$A = -·6240$, $B = +·7706$, $C = -·1297$; $\delta = +2$; $h = +7$;
$D = +·777$, $E = +·629$; $G = +·082$, $H = -·101$, $K = -·992$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Djakarta		22·0	273	e 4 52	+10	—	—	—	—	—
Manila		23·3	341	e 4 56	+ 2	—	—	—	—	—
Brisbane	Z.	30·2	134	i 5 57a	− 1	—	—	i 7 9	PP	—
Riverview		33·3	146	i 6 27k	+ 3	e 12 36	sS	i 7 46	PP	—
Kaimata	N.E.	51·1	140	e 8 50	+ 2	—	—	—	—	—
Cobb River	E.	51·2	138	e 8 48	− 1	—	—	e 10 2	PP	—
Wellington		52·7	137	i 8 59	− 1	—	—	—	—	—
Kurmenty		68·2	323	i 10 43	− 2	—	—	—	—	—
Andijan		70·7	317	e 10 49	−11	19 45	−15	—	—	—
Fergana		70·9	317	e 11 1	− 1	—	—	—	—	—
Kulyab		71·2	315	e 11 1	− 2	—	—	—	—	—
Obi-garm		71·6	315	e 11 5	− 1	—	—	—	—	—
Stalinabad		72·2	314	i 11 9	0	e 20 14	− 3	—	—	—
Tashkent		73·1	317	i 11 14	0	i 20 23	− 4	—	—	—
Tchimkent		73·3	319	i 11 14	− 2	—	—	—	—	—
Mary		76·9	312	11 38	+ 2	—	—	—	—	—
Sverdlovsk		84·7	329	12 15	− 2	22 19	−10	—	—	—
Tiflis		90·6	312	e 12 37	− 8	e 22 59	[− 1]	—	—	—
Borzhomi		91·7	312	e 12 57	+ 7	—	—	—	—	—
College		93·8	25	e 12 56	− 4	—	—	—	—	—
Mineral	Z.	109·6	50	i 18 13k	[+ 2]	—	—	—	—	—
Lick	Z.	109·9	53	e 18 57a	PP	—	—	—	—	—
Pasadena	Z.	113·0	57	i 18 19	[+ 1]	—	—	—	—	—
China Lake		113·3	54	i 18 20	[+ 1]	—	—	e 21 38	PKS	—
Hungry Horse		113·4	40	i 18 19	[0]	—	—	—	—	—
Overton	Z.	115·7	52	i 18 26	[+ 3]	—	—	e 19 26	PP	—
Pierce Ferry		116·1	53	i 18 26	[+ 2]	—	—	—	—	—
Tucson		119·4	57	i 18 32	[+ 1]	—	—	e 21 52	PKS	—
Tamanrasset	Z.	123·7	293	e 18 41	[+ 2]	e 22 0	PKS	e 19 41	PP	—
Huancayo		149·0	130	i 19 30	[+ 5]	—	—	—	—	—
La Paz		150·7	145	19 38	[+11]	—	—	—	—	—
San Juan		161·7	52	i 20 29	PKP_2	—	—	—	—	e 49·8

Riverview also gives iN =16.m32s., iZ =17m.39s., iN =17m.42s.

Jan. 29d. 5h. 2m. 10s. Epicentre 43°·6N. 128°·0W. (as on 1947, Oct. 15d.).

$A = -·4473$, $B = -·5725$, $C = +·6872$; $\delta = +8$; $h = -3$;
$D = -·788$, $E = +·616$; $G = -·423$, $H = -·542$, $K = -·727$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		
		°	°	m. s.	s.	m. s.	s.	m. s.		
Shasta Dam		5·1	122	e 1 21	+ 1	—	—	—	—	—
Seattle		5·7	42	e 1 17	−11	—	—	i 1 58	P_g	
Mineral	Z.	5·8	122	e 1 26k	− 3	i 2 30	− 8	—	—	—
Reno	Z.	7·4	121	e 2 14	P *	—	—	—	—	—
Lick	Z.	7·9	140	i 1 58a	− 1	—	—	—	—	—
Fresno	Z.	9·3	134	e 2 18a	+ 1	—	—	—	—	—
Tinemaha	Z.	9·9	127	e 2 29	+ 4	—	—	—	—	—
Hungry Horse		10·8	59	i 2 37	− 2	—	—	—	—	—
China Lake	Z.	11·2	131	e 2 45	+ 1	—	—	—	—	—
Pasadena	Z.	12·1	138	e 2 57	0	—	—	—	—	—
Riverside	Z.	12·6	135	e 3 5	+ 2	—	—	—	—	—
Overton	Z.	12·6	120	e 3 4	+ 1	—	—	—	—	—
Pierce Ferry		13·1	120	i 3 11	+ 1	—	—	—	—	—
Tucson		17·6	124	e 4 11	+ 3	—	—	—	—	—

Additional readings :—
Seattle e =1m.37s., i =2m.9s,
Mineral iZ =1m.34s.
Lick iZ =2m.5s,

Jan. 29d. 5h. 43m. 41s. Epicentre 43°·6N. 128°·0W. (as at 5h. 2m.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ferndale	E.	4·1	136	—	—	e 1 45	−10	—	—	—
Shasta Dam		5·1	122	e 1 17	− 3	—	—	—	—	—
Seattle		5·7	42	e 1 35	+ 7	i 2 43	+ 8	e 2 0	P_g	i 4·0
Mineral	Z.	5·8	122	e 1 26a	− 3	e 2 56	S*	i 1 39	P*	—
Victoria		5·9	31	e 1 32	+ 1	i 2 49	+ 9	i 1 41	P*	—
San Francisco	E.	7·1	142	—	—	e 2 31	P_g	—	—	—
Berkeley		7·2	141	e 1 44	− 5	e 3 9	− 4	e 1 59	P*	—
Reno		7·4	121	e 1 50k	− 2	—	—	—	—	—
Branner	N.	7·6	142	e 2 9	+14	—	—	—	—	—
Santa Clara		7·7	141	e 2 23	P_g	e 3 50	S*	—	—	—
Lick		7·9	140	e 1 54a	− 5	—	—	—	—	e 5·4
Fresno		9·3	134	e 2 19a	+ 2	—	—	—	—	e 5·8
Tinemaha	Z.	9·9	127	e 2 28	+ 3	—	—	—	—	—
Hungry Horse		10·8	59	e 2 33	− 6	—	—	—	—	—
Butte		11·2	73	e 3 10	?	—	—	—	—	e 6·1
China Lake	Z.	11·2	131	e 2 42	− 2	—	—	—	—	—
Logan		12·0	90	e 3 3	+ 8	e 5 23	+12	—	—	e 6·4
Pasadena	Z.	12·1	138	e 2 54	− 3	—	—	—	—	—
Bozeman		12·2	75	e 3 12	+14	—	—	—	—	e 6·0
Riverside	Z.	12·6	135	e 3 1	− 2	—	—	—	—	—
Overton	Z.	12·6	120	e 3 0	− 3	—	—	—	—	—
Boulder City		12·7	122	e 3 3	− 2	—	—	—	—	—
Pierce Ferry		13·1	120	e 3 5	− 5	—	—	—	—	—
Sitka		14·2	345	e 3 29	+ 5	e 6 22	+18	—	—	e 7·0
Tucson		17·6	124	e 4 8	0	—	—	—	—	e 7·6
Rapid City	E.	17·9	79	e 4 12	0	e 7 38	+ 8	—	—	e 9·8
College		24·0	340	e 5 22	+ 5	e 9 50	+18	e 8 58	PcP	i 12·5
St. Louis		28·7	87	e 6 16	+15	e 11 5	+15	i 6 49	PP	e 13·5
Honolulu		33·3	238	—	—	e 10 55	?	—	—	e 14·5
Tacubaya		34·1	126	i 6 51	+ 3	—	—	—	—	—
Resolute Bay		34·5	15	7 4	+12	e 12 38	+18	—	—	—
Ottawa		36·8	68	e 7 19	+ 8	—	—	—	—	e 18·5
Seven Falls	E.	39·6	64	e 7 42	+ 7	—	—	—	—	—
Vladivostok		68·0	309	—	—	e 21 17	?	—	—	—
Rathfarnham Castle		71·3	33	—	—	e 29 5	SSS	—	—	e 36·3
Huancayo		73·2	126	e 11 51	+16	—	—	—	—	—
Irkutsk		74·4	331	e 11 54	+12	e 21 19?	+ 3	—	—	—
Kew		75·0	31	—	—	e 21 32	+ 9	—	—	e 31·3
Paris		78·2	31	e 12 18	+15	—	—	—	—	e 37·3
Sverdlovsk		79·7	356	12 20	+ 9	22 20	+ 7	—	—	—
Strasbourg		80·3	28	e 12 33?	+19	e 28 19	SS	—	—	e 34·3
Stuttgart	Z.	80·6	27	e 12 28?	+12	—	—	—	—	e 34·3
La Paz		81·0	123	e 12 31	+13	e 22 31	+ 4	—	—	—
Riverview		106·5	238	e 18 33	PP	—	—	—	—	e 49·8

Additional readings :—
Seattle eP*? =1m.46s., e =1m.55s. and 2m.27s., iS*? =3m.2s., i =3m.34s., iS_g? = 3m.43s.
Victoria e =1m.35s., i =1m.47s.
Lick iZ =2m.6s.
Fresno eEZ =2m.32s.
Pasadena iZ =3m.5s.
Pierce Ferry iP =3m.8s.
Tucson i =4m.20s., e =5m.28s. and 6m.44s.
Rapid City iE =4m.22s.
College i =5m.27s.
St. Louis i =6m.41s.
Tacubaya i =7m.29s.
Paris e =12m.33s.
Long waves were also recorded at Christchurch, Wellington, Ksara, and other American and European stations.

Jan. 29d. 10h. 27m. 59s. Epicentre 15°·5N. 91°·7W. Depth of focus 0·010.
(as on 1947, June 25d.).

$A = -·0286$, $B = -·9637$, $C = +·2656$; $\delta = +8$; $h = +6$;
$D = -1·000$, $E = +·030$; $G = -·008$, $H = -·265$, $K = -·964$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vera Cruz		5·6	312	e 1 24	+ 2	e 2 32	+ 6	—	—	—
Merida		5·8	21	e 1 34	+ 9	e 2 49	+18	—	—	—
Puebla		7·1	301	e 1 44	+ 1	i 3 5	+ 2	—	—	—
Tacubaya		8·1	300	1 55	− 2	i 3 32	+ 5	—	—	—
Miami		14·9	44	i 3 37	+10	e 6 27	+17	—	—	—
Bogota		20·4	119	i 4 41	+10	e 8 37	+28	e 5 25	PPP	—
St. Louis		23·1	3	i 5 2	+ 4	i 9 14	+16	i 5 24	pP	—
Tucson		24·1	318	i 5 6	− 1	e 6 3	PP	i 5 27	pP	e 10·1
San Juan		24·6	79	i 5 19	+ 7	—	—	—	—	—
Morgantown		26·1	20	i 5 31	+ 5	—	—	i 5 54	pP	—
Washington	z.	26·6	26	e 5 59	pP	—	—	—	—	—
Cleveland		27·3	16	i 5 41k	+ 4	i 11 12	?	i 6 5	pP	—
Pierce Ferry		28·6	320	i 5 47	− 2	—	—	i 6 10	pP	—
Palomar	z.	28·9	314	i 5 56	+ 4	—	—	i 6 11	pP	—
Boulder City		29·0	319	i 5 52	− 1	e 15 53	ScS	i 6 13	pP	—
Overton	z.	29·1	320	i 5 52	− 2	—	—	—	—	—
Riverside	z.	29·6	314	i 5 56	− 2	—	—	i 6 16	pP	—
Palisades		29·7	27	i 6 3	+ 4	—	—	—	—	—
Pasadena	z.	30·2	314	e 6 0	− 3	—	—	i 6 21	pP	—
China Lake	z.	30·7	317	i 6 6	− 2	i 12 39	PcS	i 6 27	pP	—
Logan		31·4	331	e 5 57	−17	—	—	e 6 37	sP	—
Tinemaha	z.	31·9	318	i 6 16	− 2	e 12 42	PcS	i 6 37	pP	—
Harvard		32·0	29	e 6 23	+ 4	—	—	—	—	—
Weston		32·0	29	i 6 10	− 9	—	—	—	—	—
Ottawa	z.	32·7	21	(e 6 28a)	+ 3	—	—	(e 6 51)	pP	—
Lick	z.	34·3	316	e 6 36a	− 3	—	—	e 6 58	pP	—
Reno		34·3	321	e 6 37a	− 2	—	—	e 6 59	pP	—
Shawinigan Falls	N.	34·8	23	e 7 8	pP	—	—	—	—	—
Mineral	z.	35·9	320	i 6 51k	− 1	—	—	i 7 22	sP	—
Hungry Horse		37·6	336	e 7 4	− 3	—	—	i 9 21	PcP	—
La Paz		39·4	143	e 7 25	+ 3	e 13 23	+ 7	—	—	19·7
College		62·0	337	i 10 9	− 3	e 14 44	ScP	i 10 33	pP	—
Tamanrasset	z.	90·5	66	i 12 55a	+ 3	—	—	e 13 22	pP	—

Additional readings :—
Tacubaya e = 2m.52s.
St. Louis e = 5m.16s., iPP = 5m.35s.
Tucson e = 6m.59s., iPcP = 8m.48s.
Palomar iZ = 6m.21s. and 6m.33s.
Riverside iZ = 7m.59s. and 8m.25s.
Pasadena iZ = 6m.35s.
China Lake iZ = 6m.40s., iPcP = 9m.3s.
Logan e = 9m.41s.
Tinemaha ePcPZ = 9m.6s.
Ottawa iZ = (7m.2s.), readings have been reduced by 3m.
Reno eN = 7m.25s.
Mineral iZ = 6m.55s.
College isP = 10m.49s., i = 11m.16s.
Long waves were also recorded at Guadalajara.

Jan. 29d. Readings also at 0h. (La Plata and near Kluychi), 1h. (Pierce Ferry and near Ashkabad), 2h. (near Huancayo and near Apia), 3h. (Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton (2), Pierce Ferry (2), Fresno, Lick, Mineral, Hungry Horse, and College), 4h. (Stuttgart and Tamanrasset), 5h. (College, Tucson, and La Paz), 6h. (College, Tucson, and Tacubaya), 8h. (Tacubaya), 9h. (Pierce Ferry and College), 10h. (Lick, Ashkabad, Andijan, Khorog, and near Kulyab), 11h. (Tucson, near Tacubaya, Stuttgart, near Basle, and Zürich), 12h. (Tucson, near Istanbul, and near Algiers Univ.), 14h. (Strasbourg and Stuttgart), 15h. (Seattle), 18h. (near Khorog), 20h. (Hungry Horse, near Akhalkalaki, Gandzha, and Stepanavan), 21h. (Tucson and College), 22h. (near Mizusawa), 23h. (La Paz).

Jan. 30d. 11h. 16m. 46s. Epicentre 16°·3N. 98°·6W.
(as on 1950, Dec. 26d., and foreshock of 19h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca		1·9	68	0 45	P_g	—	—	—	—	1·4
Puebla		2·8	8	0 56	P_g	—	—	—	—	1·8
Tacubaya		3·1	350	0 58	P*	1 45	S_g	—	—	—
Vera Cruz		3·7	39	1 11	P_g	—	—	—	—	2·3
Guadalajara		6·3	315	1 32	− 4	—	—	—	—	3·1
Merida		9·7	61	—	—	i 4 42	S*	—	—	—
Tucson		19·4	328	i 4 30	0	e 8 24	SS	i 5 5	PPP	e 9·5
St. Louis		23·4	16	e 5 13	+ 2	e 9 32	+11	—	—	—
Florissant		23·6	16	e 5 15	+ 2	e 9 38	+13	—	—	—
Pierce Ferry		24·0	328	i 5 19	+ 2	e 12 44	ScP	—	—	—
Boulder City		24·3	327	e 5 23	+ 3	—	—	—	—	e 12·3
Riverside	z.	24·4	321	e 5 21	0	—	—	—	—	—
Overton	z.	24·6	328	i 5 24	+ 1	—	—	—	—	i 13·3
Pasadena		25·0	321	e 5 28	+ 1	—	—	—	—	e 14·1
China Lake	z.	25·8	323	i 5 33	− 1	—	—	i 5 40	P	—
Tinemaha	z.	27·1	324	e 5 45	− 1	—	—	—	—	—
Fresno		27·7	322	e 5 48	− 4	—	—	e 6 34	PP	—
Logan		27·8	339	e 6 3	+10	—	—	—	—	e 15·1
Rapid City	E.	28·0	353	e 5 58	+ 3	—	—	e 6 49	PP	e 14·5
Lick	z.	29·2	321	i 6 6k	+ 1	—	—	i 6 10	P	—
Reno		29·6	326	e 6 10	+ 1	—	—	—	—	—
Philadelphia		31·2	36	—	—	e 11 49	+20	—	—	e 19·8
Palisades		32·6	36	—	—	e 12 0	+ 9	—	—	—
Hungry Horse		34·4	341	e 6 50	− 1	—	—	i 6 57	pP	—
Ottawa		34·8	28	e 6 55	+ 1	e 12 33	+ 8	—	—	—
Seattle		36·9	334	i 7 19k	+ 7	—	—	—	—	e 20·6
La Paz		44·3	135	8 20	+ 7	18 14	SS	—	—	21·2
Resolute Bay		58·4	1	9 58	− 2	17 56	− 6	e 21 38	SS	29·2
College		58·7	338	i 10 1	− 1	e 18 10	+ 4	i 10 57	PcP	e 32·5
Stuttgart	z.	89·1	39	e 21 20	PKS	—	—	—	—	—
Tamanrasset	z.	96·2	65	22 44	?	—	—	—	—	—

Additional readings :—
Florissant iS =9m.41s.
Fresno eZ =5m.52s.
Rapid City eE =14m.1s.
Hungry Horse ePcP =9m.29s.
Resolute Bay eP =10m.54s.
College ePcS? =14m.49s., iS =18m.21s.
Long waves were also recorded at Manzanillo, Huancayo, Berkeley, Saskatoon, and Victoria.

Jan. 30d. 13h. Undetermined shock.

Irkutsk iP =31m.45s., iS =32m.25s.
Ili iP =36m.0s.
Naryn eP =36m.50s.
Sverdlovsk eP =36m.59s., S =41m.36s.
Obi-garm eP =37m.43s.
College eP =39m.43s.
Stuttgart ePZ =40m.49s.?, e =46·1m.
Hungry Horse eP =40m.51s.
Tamanrasset iZ =43m.7s. a.

Jan. 30d. 19h. 0m. 34s. Epicentre 16°·3N. 98°·6W. (as at 11h.).

A = −·1436, B = −·9495, C = +·2789; δ = −4; h = +5;
D = −·989, E = +·150; G = −·042, H = −·276, K = −·960.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca		1·9	68	0 52	S	(0 52)	− 7	—	—	1·5
Puebla		2·8	8	0 55	P_g	—	—	—	—	1·7
Tacubaya		3·1	350	0 57	P*	—	—	—	—	1·7
Vera Cruz		3·7	39	1 14	P_g	2 9	S_g	—	—	—
Guadalajara		6·3	315	i 1 34	− 2	—	—	—	—	3·0
Merida		9·7	61	e 2 45	P*	4 36	S*	—	—	—
Tucson		19·4	328	i 4 29	− 1	—	—	—	—	e 9·5
Galerazamba		23·3	99	—	—	9 26	+ 6	—	—	—
St. Louis		23·4	16	i 5 12	+ 1	e 9 25	+ 4	e 5 42	PP	—
Florissant		23·6	16	e 5 14	+ 1	e 9 32	+ 7	—	—	—
Pierce Ferry		24·0	328	i 5 17	0	i 12 47	ScP	i 12 56	PcS	i 10·7
Boulder City		24·3	327	e 5 22	+ 2	—	—	—	—	e 10·8
Riverside	Z.	24·4	321	i 5 23	+ 2	—	—	—	—	—
Lincoln	E.	24·5	3	—	—	e 9 53	+13	—	—	e 12·8
Overton	Z.	24·6	328	e 5 25	+ 2	e 12 54	ScP	—	—	i 10·8
Pasadena		25·0	321	i 5 27	0	i 10 5	+16	—	—	e 11·9
China Lake	Z.	25·8	323	i 5 32	− 2	—	—	—	—	—
Bogota		26·7	113	i 5 52	+ 9	i 10 27	+10	i 6 28	PP	—
Tinemaha	Z.	27·1	324	e 5 46	0	—	—	—	—	—
Chicago		27·2	17	e 5 48	+ 1	e 10 28	+ 3	—	—	e 16·2
Fresno		27·7	322	e 5 50a	− 2	e 11 25	+52	—	—	e 17·4
Logan		27·8	339	e 5 53	0	e 10 43	+ 8	—	—	e 14·8
Rapid City	E.	28·0	353	e 5 56	+ 1	e 10 40	+ 2	—	—	i 15·2
Morgantown		28·4	30	i 5 59	+ 1	—	—	i 6 47	PP	—
Cleveland		29·1	26	e 6 1	− 3	e 11 0	+ 4	e 12 8	SS	—
Lick	Z.	29·2	321	e 6 24	+19	—	—	i 6 41	PP	e 16·0
Santa Clara		29·4	321	e 6 6	− 1	e 12 58	SSS	—	—	e 17·8
Reno		29·6	326	e 6 10k	+ 1	e 11 40	+36	—	—	e 15·9
Berkeley		29·9	321	e 5 57	−15	e 11 18	+ 9	e 6 17	P	e 14·9
Pennsylvania	N.	30·3	32	—	—	i 11 26	+11	—	—	—
Bozeman		31·1	344	—	—	e 11 34	+ 6	—	—	e 16·6
Mineral		31·2	325	e 6 24k	+ 1	—	—	—	—	e 17·7
Philadelphia		31·2	36	e 6 27	+ 4	e 11 32	+ 3	—	—	e 13·4
Ukiah		31·3	323	—	—	e 11 26	− 5	—	—	e 15·4
Buffalo		31·4	28	i 6 24	− 1	e 11 44	+12	—	—	—
Shasta Dam		31·9	325	e 6 27	− 2	e 11 59	+19	—	—	e 17·1
Fordham		32·5	36	e 6 36	+ 2	i 12 4	+15	—	—	—
Palisades		32·6	36	i 6 36	+ 1	e 11 57	+ 6	—	—	—
Hungry Horse		34·4	341	e 6 50	− 1	e 12 9	−10	—	—	e 18·4
Bermuda		34·6	56	e 6 57	+ 4	e 12 31	+ 9	—	—	e 14·6
Ottawa		34·8	28	e 6 54a	0	12 34	+ 9	—	—	e 21·7
Weston		34·9	36	e 6 44	−11	e 12 36	+ 9	—	—	—
Huancayo		36·4	139	e 7 19	+11	e 12 59	+ 9	—	—	e 14·6
Seattle		36·9	334	e 7 12k	0	—	—	—	—	e 20·5
Seven Falls	E.	38·4	31	8 58	PP	13 32	+12	16 21	SSS	22·3
La Paz		44·3	135	i 8 18	+ 5	i 14 56	+ 8	i 18 13	SS	21·9
Resolute Bay		58·4	1	9 57	− 3	18 5	+ 3	e 13 32	PPP	—
College		58·7	338	e 10 0	− 2	e 17 52	−14	—	—	e 30·0
Paris		85·0	42	i 12 40	+ 2	—	—	i 13 3	?	e 45·4
Tamanrasset	Z.	96·2	65	e 13 34	+ 3	—	—	e 17 28	PP	—
Ksara		113·9	42	e 19 35?	PP	e 29 29	PS	—	—	—

Additional readings :—
St. Louis iS = 9m.33s.
Florissant iS = 9m.37s.
Bogota iSS = 12m.46s., iScPEN = 13m.44s., iScSEN = 15m.55s.
Fresno eZ = 6m.12s., 11m.11s., and 14m.59s., eE = 15m.58s.
Cleveland ePN = 6m.4s., iSE = 11m.3s., iE = 18m.19s.
Reno eZ = 11m.33s.
Berkeley eZ = 6m.42s., eE = 13m.44s.
Pennsylvania iE = 11m.29s.
Seven Falls ScSE = 17m.29s.
Resolute Bay ScS = 19m.46s.
Long waves were also recorded at Manzanillo, Harvard, and Saskatoon.

Jan. 30d. 23h. 7m. 24s. Epicentre 32°·4N. 33°·4E.

Intensity V at Port Said; IV at Gaza, Jaffa, and Haifa; III-IV at Jerusalem; II at Beyrouth and Zahlé. Epicentre as adopted. Macroseismic radius 300km.

N. Shalen.
La Seismicity au Levant. Bulletin of the Research Council of Israel, vol. II, No. 1, June, 1952, pp. 15-16.

$A = +\cdot7062$, $B = +\cdot4657$, $C = +\cdot5333$; $\delta = 0$; $h = +1$;
$D = +\cdot550$, $E = -\cdot835$; $G = +\cdot445$, $H = +\cdot294$, $K = -\cdot846$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara		2·5	56	i 0 43	0	15 33?	ScS	—	—	—
Helwan	z.	3·1	215	i 0 50	− 1	1 21	− 8	1 5	P_g	—
Istanbul		9·3	340	i 2 17	0	e 3 56	− 9	—	—	e 7·6
Erevan		11·8	46	e 2 57	+ 4	—	—	—	—	—
Abastumanj		12·0	36	i 2 57	+ 2	—	—	—	—	—
Yalta		12·1	3	i 2 56	− 1	5 14	0	—	—	—
Borzhomi		12·3	37	i 3 2	+ 3	—	—	—	—	—
Theodosia		12·7	7	e 3 4	− 1	—	—	—	—	—
Gori		12·8	39	i 3 8	+ 2	—	—	—	—	—
Sofia		13·0	328	i 3 8	− 1	i 5 50	SS	i 3 22	PP	i 7·4
Tiflis		13·0	41	i 3 10	+ 1	—	—	—	—	—
Bucharest	N.	13·3	337	e 3 18	+ 5	e 5 51	+ 9	e 3 31	PP	i 8·6
Shemakha		14·7	51	i 3 24?	− 7	—	—	—	—	—
Taranto		15·3	306	3 31	− 8	e 6 15	−15	e 3 56	PPP	e 9·4
Messina		15·7	297	e 3 39k	− 5	i 6 32	− 7	i 4 5	pP	e 8·2
Belgrade		16·0	325	e 3 47a	− 1	e 6 51	+ 5	i 7 0	SS	—
Timisoara		16·3	328	i 3 54	+ 2	e 7 31	SSS	e 4 13	PPP	e 9·6
Kalossa		17·9	327	4 15	+ 3	7 28	− 2	4 28	PP	—
Budapest		18·6	329	4 21	0	7 50	+ 4	4 45	PPP	—
Lwow		18·8	341	e 4 22	− 1	i 7 46	− 4	—	—	—
Rocca di Papa		18·9	306	e 4 20	− 4	e 7 51	− 2	i 5 16	?	—
Rome		19·1	306	i 4 24	− 3	i 7 58	+ 1	i 4 35	pP	e 10·4
Ogyalla		19·3	328	4 29	0	e 8 7	+ 5	e 4 55	pP	—
Skalnate Pleso		19·4	334	4 34	+ 4	8 12	+ 8	e 8 56	PcP	—
Kizyl-Arvat		19·7	62	i 4 31	− 3	—	—	—	—	—
Triest		20·1	317	i 4 37	− 1	i 8 19	0	8 35	sS	i 9·4
Vienna		20·4	326	i 4 41?	0	e 8 23	− 2	—	—	—
Florence		20·7	310	e 4 44	0	8 36	+ 5	i 5 3	PP	—
Prato		20·9	310	i 4 46	0	—	—	i 4 55	pP	—
Bologna		21·0	313	i 4 50	+ 3	e 8 52	+15	i 5 14	PP	—
Ashkabad		21·1	67	i 4 49	+ 1	i 8 42	+ 3	—	—	—
Salo		22·0	314	e 5 0k	+ 2	i 9 3	+ 7	i 5 10	pP	—
Prague		22·6	327	i 5 4a	+ 1	e 9 6	− 1	e 5 19	pP	e 11·9
Pavia		22·7	312	i 5 6k	+ 2	i 9 16	+ 7	i 5 39	pP	—
Chur		23·2	315	e 5 10k	+ 1	e 9 31	+13	—	—	—
Moscow		23·5	5	i 5 11	− 1	i 9 22	− 1	—	—	—
Cheb		23·6	324	5 13	0	e 9 22	− 3	e 10 18	SS	—
Ravensburg		23·7	317	e 5 14	0	e 9 41	+14	e 5 26	pP	e 11·2
Mary		23·8	68	i 5 16	+ 1	—	—	—	—	—
Collmberg		24·1	328	i 5 19	+ 1	e 9 37	+ 3	i 5 40	PP	e 12·3
Zürich		24·1	316	e 5 17k	− 1	e 9 38	+ 4	—	—	—
Ebingen		24·3	318	e 5 19	− 1	e 9 41	+ 4	e 5 32	?	—
Stuttgart		24·4	320	i 5 22k	+ 1	i 9 40	+ 1	i 5 44	pP	e 12·6
Jena		24·5	326	e 5 22	0	e 9 47	+ 7	e 5 45	PP	—
Basle		24·7	316	e 5 25	+ 1	e 10 21	?	—	—	—
Potsdam		24·8	329	e 5 27	+ 2	i 9 50	+ 4	—	—	e 12·6
Neuchatel		24·9	315	e 5 26	0	e 9 58	+11	e 6 19	?	—
Karlsruhe		25·0	321	i 5 26	− 1	e 9 57	+ 8	—	—	e 13·6
Strasbourg		25·2	319	i 5 29k	0	e 9 50	− 2	i 5 54	pP	e 14·6
Algiers Univ.	z.	25·3	288	i 5 32a	+ 2	e 9 46	− 8	i 5 53	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Besançon		25·6	314	i 5 33	+ 1	—	—	—	—	—
Tamanrasset	z.	26·4	256	i 5 42	+ 2	e 10 30	+18	i 6 7	pP	—
Barcelona		26·5	300	e 5 42	+ 1	11 0	+46	—	—	e 13·2
Clermont-Ferrand		26·9	308	i 6 17?	+32	e 10 51?	+31	—	—	e 14·2
Copenhagen		27·5	334	i 5 54	+ 4	e 10 18	−12	—	—	13·1
Pulkovo		27·5	357	e 5 49	− 1	i 10 24	− 6	—	—	—
Tortosa		27·6	297	5 52	+ 1	10 34	+ 2	6 23	pP	—
Samarkand		28·0	64	e 5 56	+ 1	—	—	—	—	—
Alicante		28·2	293	—	—	12 11	SS	15 39	?	12·6
Helsinki		28·3	351	e 5 56	− 1	e 10 54	+11	e 6 22	pP	e 14·6
Paris		28·4	315	i 5 57	− 1	i 10 44	− 1	i 6 4	pP	e 14·6
Stalinabad		29·3	66	e 6 7	+ 1	i 10 59	0	—	—	—
Upsala		29·4	343	i 6 12	+ 5	e 10 56	− 5	i 6 33	pP	e 15·6
Almeria		29·7	289	i 6 10	0	i 11 6	0	7 18	PPP	14·2
Lunacharskoe		29·9	61	e 6 11	− 1	i 14 30	L	—	—	(i 14·5)
Tashkent		29·9	61	e 6 10	− 2	e 11 1	− 8	—	—	—
Kulyab		30·1	68	e 6 24	+11	—	—	—	—	—
Obi-garm		30·1	66	e 6 35?	+22	—	—	—	—	—
Granada		30·6	290	i 5 49k	−29	10 53	−27	7 3	PPP	14·5
Sverdlovsk		30·8	29	i 7 18	PP	11 18	− 5	i 9 14	PcP	—
Toledo		31·0	295	i 6 22	+ 1	e 11 25	− 1	13 11	SS	—
Kew		31·1	318	i 6 21	− 1	e 11 18	−10	e 7 33	PP	e 14·1
Jersey	E.	31·3	313	e 6 22	− 2	—	—	e 9 38	PcP	—
Malaga		31·3	290	i 6 23	− 1	i 11 11	−20	9 17	PcP	—
Khorog		31·6	70	e 6 28	+ 2	11 36	+ 1	—	—	—
Fergana		31·7	63	e 6 27	0	—	—	e 7 39	PP	—
Andijan		32·2	63	e 6 31	− 1	—	—	—	—	—
Frunse		34·0	59	e 6 48	0	i 12 10	− 3	—	—	—
Aberdeen	E.	34·7	327	i 7 41	?	—	—	—	—	i 17·6
Naryn		34·9	62	e 6 54	− 1	12 24	− 3	—	—	—
Rathfarnham Castle		35·2	319	i 6 49	− 9	e 12 5	−26	e 8 13	PP	e 15·6
Almata		35·7	58	e 7 2	0	e 12 35	− 4	—	—	—
Ili		35·8	57	7 1	− 2	—	—	—	—	—
New Delhi	N.	37·7	83	e 7 20	+ 1	i 13 8	− 2	8 48	PP	—
Bombay	N.	37·8	100	e 7 20	0	e 13 20	+ 9	i 8 45	PP	—
Semipalatinsk		38·7	47	e 7 17?	−10	—	—	—	—	—
Poona	E.	38·8	100	7 26	− 2	13 23	− 3	16 3	SS	16·4
Lome		39·8	237	7 36?	0	—	—	—	—	—
Hyderabad	N.	43·2	98	e 8 4	0	14 44	+12	17 42	SS	22·3
Kodaikanal	E.	46·2	107	e 8 56	+28	e 15 31	+16	10 49	PP	19·8
Chatra		46·7	82	e 8 30	− 2	—	—	e 8 38	P	—
Calcutta	E.	49·3	86	e 7 2	?	15 57	− 2	—	—	—
Irkutsk		53·8	45	e 11 46?	PP	16 58	− 3	e 12 34	PPP	—
Pretoria	Z.	58·0	185	i 9 56	− 1	—	—	—	—	—
Grahamstown	Z.	65·7	187	e 10 49	+ 1	—	—	—	—	—
Resolute Bay		68·0	347	11 2	− 1	20 2	0	13 42	PP	—
Vladivostok		74·2	48	—	—	i 21 5	− 9	—	—	—
Seven Falls	E.	75·7	317	—	—	e 21 31	+ 1	—	—	32·6
Weston		78·5	313	i 12 6	+ 2	—	—	—	—	—
Harvard		78·6	313	i 12 6	+ 1	—	—	—	—	e 45·6
Bermuda		79·4	301	—	—	e 22 11	+ 1	e 27 11	SS	e 35·8
Ottawa		79·4	317	i 12 10	+ 1	e 22 11	+ 1	—	—	—
Manila		80·3	79	e 11 25	−49	—	—	—	—	—
Palisades		80·9	313	i 12 18	+ 1	i 22 27	+ 1	e 27 56	SS	—
Fordham		81·0	313	i 12 19	+ 1	e 22 30	+ 3	—	—	—
Philadelphia		82·3	313	e 23 50	PPS	e 22 24	−16	i 23 4	sS	e 38·8
Buffalo		82·7	317	i 12 27	0	e 22 44	0	—	—	—
College		83·1	2	i 12 28	− 1	e 23 0	+12	i 13 5	pP	e 44·6
Washington	Z.	84·1	313	i 12 38	+ 4	—	—	i 13 14	pP	—
Cleveland		85·2	317	i 12 39k	0	e 23 18	+ 9	e 22 55	SKS	—
Morgantown		85·4	315	i 12 42	+ 2	—	—	i 13 34	?	—
San Juan		88·0	290	e 12 55	+ 2	—	—	—	—	—
Chicago		88·4	321	—	—	e 23 37	− 3	—	—	—
St. Louis		92·0	319	e 13 13	+ 1	e 23 55	{− 1}	i 16 59	PP	—
Hungry Horse		94·5	339	e 13 22	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bozeman		95·9	335	—	—	e 23 8	?	—	—	e 42·7
Bogota		102·1	284	—	—	e 24 55	[−18]	—	—	47·6
Mineral	Z.	104·0	340	e 17 44	[−37]	e 42 3	SKP,P′	—	—	—
Reno	N.	104·2	338	e 17 39	[−42]	—	—	—	—	—
Overton	Z.	105·1	334	e 18 18	[− 5]	—	—	e 18 37	PP	—
Pierce Ferry		105·3	333	e 17 28	?	—	—	—	—	—
Tucson		107·4	328	e 19 1	PP	—	—	—	—	e 49·8
La Paz		108·2	262	e 14 24	P	25 20	[+15]	i 18 57	PP	55·8
Huancayo		112·1	270	e 29 12	PS	e 25 53	[−27]	e 35 8	SS	e 52·3
Riverview	E.	128·6	110	—	—	e 31 0	PS	—	—	e 61·6

Additional readings :—
Istanbul eN = 2m.22s. and 3m.42s., eE = 4m.16s.
Bucharest eN = 4m.6s.
Messina iZ = 4m.20s., i = 6m.51s.
Belgrade iZ = 3m.53s., eNW = 4m.15s., eNE = 4m.26s., iNW = 5m.3s., iNE = 5m.9s.
Timisoara iSSE = 7m.49s.
Kalossa PPPEN = 4m.39s., SSN = 7m.49s., SSE = 7m.53s., PcPE = 8m.50s.
Budapest SSN = 8m.13s., SSE = 8m.16s., SSSN = 8m.24s., SSSE = 8m.28s., PcSE = 12m.24s., PcSN = 12m.36s.
Rome iPPZ = 4m.41s., iZ = 5m.44s., iSSN = 8m.28s.
Ogyalla e = 4m.40s.?, esPE = 5m.4s., e = 5m.32s., 5m.59s., 7m.6s., 8m.20s., and 8m.56s.
Skalnate Pleso e = 4m.45s., esP = 5m.31s., eN = 5m.38s., ePcP? = 8m.28s., e = 9m.22s. and 10m.58s., eScP = 11m.57s.
Triest i = 4m.50s., iPP = 5m.14s., iPcP? = 9m.12s.
Florence i = 4m.47s., e = 5m.34s.
Bologna i = 5m.7s.
Salo iPPZ = 5m.34s., iE = 5m.40s., iZ = 6m.44s., iN = 9m.7s.
Prague ePP = 5m.41s., esPP? = 6m.4s., esS?E = 9m.36s., and numerous unidentified e readings.
Pavia i = 6m.28s. and 7m.35s., eZ = 9m.9s.
Cheb esP = 5m.38s., e = 5m.59s., 7m.4s., and 8m.13s., eN = 8m.34s., eE = 9m.34s., e = 9m.44s., esS? = 10m.4s., eScPN = 12m.11s.
Ravensburg e = 6m.23s., 7m.10s., and 10m.1s.
Collmberg eN = 5m.27s., iZ = 5m.33s., eN = 9m.43s., eZ = 9m.47s., eSSE = 10m.33s., eZ = 10m.50s., eSSSN = 11m.3s.
Stuttgart iZ = 5m.30s., iPPZ = 5m.50s., eZ = 6m.9s., i = 6m.46s., e = 7m.42s., i = 10m.17s., iSS = 10m.49s., i = 11m.44s.
Jena e = 5m.29s., eE = 6m.20s., eN = 6m.23s., eZ = 7m.2s., eSN = 9m.50s., eN = 10m.2s., eSS?E = 11m.16s., eSS?N = 11m.19s.
Potsdam ePN = 5m.30s., iSEN = 9m.56s.
Strasbourg i = 5m.34s. and 5m.42s., iPP = 6m.5s., iPPP = 6m.16s., i = 6m.45s., 7m.2s., and 7m.33s., ePcP? = 9m.10s., iS = 9m.53s., i = 10m.2s. and 10m.12s., iSS = 10m.55s., iSSS = 11m.22s.
Algiers Univ. iPPZ = 6m.20s., eZ = 7m.0s. and 10m.28s.
Tamanrasset ePPZ = 6m.22s., eZ = 7m.58s., esS?Z = 11m.0s., ePcSZ = 12m.31s., eScSZ = 15m.55s.
Tortosa PN = 5m.56s., PP?N = 6m.50s., SSN = 11m.22s.
Helsinki ePPNZ = 6m.41s., eZ = 9m.10s. and 11m.12s., iE = 11m.15s. and 11m.51s., eE = 12m.50s.
Paris isP = 6m.16s., iPP = 6m.49s., iPPP = 7m.8s., iPcP = 9m.0s., iS = 10m.48s., isS? = 11m.5s., iSS = 12m.14s., iSSS = 12m.29s., and other unidentified i readings.
Upsala isPN = 6m.45s., iPPN = 7m.4s., ePP?E = 7m.12s., esPPN = 7m.26s., iPPPE = 7m.49s., eN = 8m.12s., ePcPN = 8m.53s., eE = 9m.34s., i = 11m.13s., esS = 11m.32s., eE = 11m.55s., iN = 12m.4s., i = 12m.16s.
Almeria PP = 6m.46s.
Granada PP = 6m.35s., PcP = 8m.29s., sS = 11m.11s., PcS = 11m.53s., SS = 12m.34s., ScS = 16m.11s.
Sverdlovsk SS = 13m.18s., SSS = 13m.30s.
Kew eZ = 6m.28s., e = 12m.0s., eSS = 12m.20s.
Malaga PP = 7m.27s., ScP = 13m.1s., ScS = 16m.51s.
Aberdeen iE = 11m.10s. and 11m.51s.
New Delhi PPPN = 9m.7s., PcSN = 13m.23s., SSSN = 16m.10s.
Poona PPE = 10m.26s., PPPE = 10m.52s., PcPE = 11m.2s., SSSE = 16m.33s.
Hyderabad eN = 12m.8s.
Kodaikanal SSE = 18m.38s., SSSE = 19m.28s.
Calcutta eE = 9m.14s., 12m.7s., and 13m.3s.
Irkutsk ScS = 19m.12s.
Resolute Bay eS = 20m.31s., ScSN = 21m.2s.
Philadelphia epS = 22m.50s., e = 25m.47s., eSS = 27m.38s.
College e = 15m.20s., 16m.52s., and 30m.33s.
Cleveland iSKKSN = 23m.23s., ePSE = 24m.12s., eSSN = 28m.56s.
St. Louis i = 13m.38s., ePPP = 18m.53s., eSS = 30m.31s.
Hungry Horse i = 13m.31s. and 15m.22s.
La Paz PS = 29m.50s., eSS = 34m.32s., eSSS = 38m.12s., Q = 47m.54s.
Long waves were also recorded at De Bilt.

Jan. 30d. Readings also at 0h. (College and near Khorog), 2h. (near Istanbul, near Gandzha, Stepanavan, and Akhalkalaki), 3h. (near Basle and Zürich), 5h. (Hungry Horse), 6h. (Hungry Horse, Merida, Vera Cruz, Tacubaya, and Tucson), 7h. (College, Messina, Obi-garm, Andijan, Khorog, Kulyab, Stalinabad, Frunse, Poona, Bombay, near New Delhi, Puebla, Vera Cruz, and near Tacubaya (3)), 8h. (College (2), Hungry Horse, Resolute Bay, La Paz, Ksara, and Tamanrasset), 9h. (Paris, Christchurch, and Tacubaya), 10h. (La Paz and Apia (2)), 11h. (Riverview, Brisbane, Christchurch, Wellington, Collmberg, and Apia), 12h. (Riverside, China Lake, Overton, Tucson, Chilisk, near Kurmenty, near Kulyab, and Obi-garm), 13h. (Tamanrasset, College, Hungry Horse, Overton, Tucson, near Vladivostok, near San Juan, and Fort de France), 14h. (Khorog, Andijan, and near Obi-garm), 15h. (College, Overton, and near Pierce Ferry). 16h. (College, Tucson, and near Istanbul (2)), 18h. (Granada, Puebla, Vera Cruz, and near Tacubaya), 19h. (Mount Wilson, China Lake, Tacubaya, Puebla, and near Oaxaca, Stalinabad, near Obi-garm, Kulyab, and Khorog), 21h. (near Messina), 23h. (Lome, Baku, Andijan, and near Khorog).

Jan. 31d. 8h. 55m. 52s. Epicentre 35°·5N. 140°·4E. Depth of focus 0·005. (as on 10d.).

Intensity V at Shimodate (Ibaraki Prefecture); IV at Utunomiya, Tokyo, Tukubasan, Mito, Kumagaya, and Osima; II-III at Tyosi, Yokohama, Mera, Hunatu, Maebasi, Kohu, Shirakawa, and Hukusima. Epicentre 35°·5N. 140°·3E. Depth 50km.

Seismo. Bull. Cent. Met. Obs., Japan, 1951. Tokyo, 1951, p.17, with macroseismic chart.

$A = -·6287$, $B = +·5201$, $C = +·5781$; $\delta = -3$; $h = 0$;
$D = +·637$, $E = +·771$; $G = -·445$, $H = +·368$, $K = -·816$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Tyosi	0·4	58	0 9	− 3	0 17	− 5
Tokyo	0·6	289	0 14k	0	0 23	− 2
Mera	0·7	219	0 18	+ 3	0 29	+ 2
Yokohama	0·7	264	0 13k	− 2	0 22	− 5
Tukubasan	0·8	341	0 15k	− 2	0 25	− 4
Mito	0·9	3	0 18	0	0 30	− 1
Kumagaya	1·0	309	0 20k	+ 1	0 33	0
Osima	1·1	229	0 21k	+ 1	0 34	− 2
Utunomiya	1·1	338	0 19k	− 1	0 30	− 6
Misima	1·2	252	0 22k	0	0 37	− 1
Hunatu	1·3	270	0 22k	− 1	0 37	− 3
Maebasi	1·3	313	0 23k	0	0 40	0
Kohu	1·5	275	0 25	− 1	0 42	− 3
Onahama	1·5	16	0 30a	+ 4	0 42	− 3
Shirakawa	1·6	355	0 27	0	0 47	0
Shizuoka	1·7	252	0 28k	0	0 48	− 2
Omaesaki	2·0	243	0 38	+ 6	0 56	− 1
Iida	2·1	270	0 44	+10	1 9	+10
Inawasiro	2·1	359	0 33	− 1	0 56	− 3
Matumoto	2·1	290	0 34	0	1 3	+4
Matusiro	2·1	301	0 21	−13	0 46	−13
Nagano	2·2	203	0 33	− 2	0 56	− 6
Hamamatu	2·3	250	0 44	+ 7	—	—
Hukusima	2·3	1	0 36a	− 1	1 3	− 1
Hatidyozima	2·4	191	0 41	+ 3	—	—
Takada	2·4	313	0 38	0	1 5	− 2
Niigata	2·7	336	1 4	S	(1 4)	−10
Takayama	2·7	284	0 51	+ 9	—	—
Nagoya	2·8	263	0 46	+ 2	1 23	+ 6
Sendai	2·8	8	0 44	0	1 23	+ 6
Toyama	2·8	294	0 37	− 7	1 9	− 8
Gihu	3·0	268	0 51	+ 4	1 24	+ 2
Kanazawa	3·2	289	0 58	+ 9	—	—
Kameyama	3·3	261	1 0	+ 9	1 33	+ 4
Hikone	3·4	269	0 55	+ 3	1 34	+ 2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Hukui		3·4	281	0 55	+ 3	—	—
Tsuruga		3·5	274	0 54	0	1 37	+ 3
Mizusawa	E.	3·7	8	1 1	+ 5	1 39	0
Owase		3·8	249	0 54	− 4	—	—
Osaka		4·1	260	1 8	+ 6	—	—
Akita		4·2	356	1 7	+ 4	—	—
Morioka		4·2	6	1 4	+ 1	1 50	− 2
Miyako		4·3	16	1 4	− 1	1 50	− 4
Kobe		4·4	259	1 1	− 5	—	—
Sumoto		4·7	257	1 20	+10	—	—
Aomori		5·3	3	1 17	− 2	—	—
Urakawa		6·9	15	1 39	− 2	2 55	− 4
College		50·8	52	i 8 57	+ 1	e 9 25	sP
Hungry Horse		73·5	52	i 11 29	+ 1	—	—
China Lake	Z.	78·5	54	e 11 58	+ 2	—	—
Tucson		85·2	54	e 12 33	+ 2	—	—
Tamanrasset	Z.	108·0	316	—	—	e 43 58	Q

Jan. 31d. 11h. 51m. 44s. Epicentre 20°·7N. 45°·6W.

A = +·6550, B = −·6689, C = +·3514 : δ = −7 ; h = +4 ;
D = −·714, E = −·700 ; G = +·246, H = −·251, K = −·936.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		19·5	267	e 4 30	− 1	—	—	—	—	e 8·4
Bermuda		20·6	307	e 4 41	− 2	e 8 24	− 5	—	—	e 8·9
La Paz		43·1	212	8 3	− 1	i 14 40	+10	e 9 52	PP	20·9
Kew		46·7	37	—	—	e 13 16	?	—	—	—
Tamanrasset	Z.	47·3	78	e 8 41	+ 4	e 10 33	PP	e 9 56	PcP	22·3
Stuttgart	Z.	51·6	43	e 9 9	− 1	—	—	—	—	—
Tucson		58·7	296	i 9 58	− 4	—	—	—	—	—
Hungry Horse		60·6	315	e 10 12	− 3	—	—	—	—	—
Pierce Ferry		61·0	300	e 10 17	− 1	—	—	—	—	—
Overton	Z.	61·3	301	i 10 21	+ 1	—	—	—	—	—
Boulder City		61·7	300	e 10 22	0	—	—	—	—	—
China Lake	Z.	63·9	300	e 10 38	+ 1	—	—	—	—	—
Riverside	Z.	64·0	299	e 10 38	0	—	—	—	—	—
Mineral	Z.	66·4	306	e 10 52a	− 1	—	—	—	—	—
Lick	Z.	66·9	303	e 10 58a	+ 2	—	—	—	—	—
College		76·5	335	e 11 52	− 2	—	—	—	—	—

Additional readings :
Tamanrasset iZ = 8m.54s.
Stuttgart eZ = 9m.22s.
Mineral eZ = 11m.4s.
College e = 12m.7s.
Long waves were also recorded at Palisades.

Jan. 31d. Readings also at 0h. (2) and 1h. (2) (near Tacubaya), 4h. (Christchurch, Kaimata, and Wellington), 6h. (Chatra), 7h. (College, Stuttgart, and Bombay), 8h. (Sofia), 9h. (Chatra), 10h. (Chatra, Brisbane, Pietermaritzburg, and College), 11h. (Mount Wilson, China Lake, Tinemaha, Pierce Ferry, Lick, Mineral, Hungry Horse, College, and Scoresby Sund), 12h. (College), 13h. (Hungry Horse (2), College, Scoresby Sund (2), and Tamanrasset), 15h. (Lick, Mineral, Hungry Horse, and College (2)), 16h. (Tucson, Pierce Ferry, Hungry Horse, Bogota, College, Tamanrasset, La Paz, Puebla (2), Vera Cruz (2), near Tacubaya (2), and near Huancayo), 17h. (near Alicante), 19h. (Apia (2)).

Feb. 1d. 6h. 7m. 47s. Epicentre 47°·8N. 16°·4E. (as on 1938, November 8d.).

Intensity IV at Gotzendorf and Vienna. Macroseismic area 2900 sq. km.

Jahrbücher der Zentralanstalt für Meteorologie und Geodynamik, Jahrgang, 1951, Neue Folge, 88. Band, Vienna, 1952, pp. E1, E2, E3.

A = +·6468, B = +·1904, C = +·7385 ; δ = −2 ; h = −5 ;
D = +·282, E = −·959 : G = +·708, H = +·209, K = −·674.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vienna		0·5	357	i 0 14	0	i 0 18	− 5	—	—	—
Ogyalla		1·2	87	e 0 26	+ 2	—	—	—	—	—
Prague		2·6	330	e 0 40	− 4	i 1 13	− 4	e 0 49	P_g	—
Jena	N.	4·4	316	e 1 26?	P_g	e 2 4	+ 2	i 2 27	S_g	—
Ravensburg		4·6	272	—	—	e 2 35	S_g	e 2 40	S_g	—
Stuttgart	z.	4·9	284	e 1 17	0	e 2 11	− 4	e 1 39	P_g	—
Zürich		5·3	268	e 1 24	+ 2	e 2 58	S_g	e 1 47	P_g	—
Strasbourg		5·8	281	—	—	e 2 39	+ 1	e 3 17	S_g	—
Basle		6·0	270	e 2 3	P_g	e 3 26	S_g	—	—	—
Paris		9·3	281	e 2 47	P*	e 3 39	?	—	—	e 5·1

Additional readings :—
Prague eP* = 45s., eN = 1m.0s., e = 1m.5s. and 1m.9s., eS* = 1m.18s., eS_g = 1m.21s.
Jena eP_g?E = 1m.30s.?, eE = 1m.50s., eS*?E = 2m.16s., iS_gEN = 2m.19s.
Ravensburg e = 2m.49s. and 2m.55s.
Stuttgart ePZ = 1m.21s., eS*?Z = 2m.37s., iS_gZ = 2m.44s. and 2m.49s., and numerous other eZ readings.
Long waves were also recorded at Besançon and Pretoria.

Feb. 1d. 16h. 50m. 0s. Epicentre 16°·7S. 173°·5W.

A = −·9522, B = −·1085, C = −·2856 ; δ = +2 ; h = +5 ;
D = −·113, E = +·994 ; G = +·284, H = +·032, K = −·958.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		3·3	30	e 0 58	+ 5	i 1 33	− 2	—	—
Wellington		26·5	201	e 5 39	− 2	e 10 18	+ 4	—	—
Cobb River	E.	27·1	205	e 5 49	+ 3	—	—	—	—
Kaimata	N.E.	28·8	205	e 6 2	0	e 10 57	+ 6	—	—
Christchurch		29·2	202	e 6 16	+11	—	—	—	—
Brisbane	z.	32·7	246	i 6 36a	0	—	—	—	—
Berkeley	z.	72·5	41	e 11 31	+ 1	—	—	—	—
Lick	z.	72·6	41	e 11 32k	+ 1	—	—	—	—
Pasadena	z.	73·0	46	i 11 33	0	—	—	i 11 52	pP
Fresno	z.	73·4	42	e 11 36k	0	—	—	—	—
Palomar	z.	73·4	47	i 11 32	− 4	—	—	—	—
Riverside	z	73·4	46	i 11 38	+ 2	—	—	—	—
Shasta Dam		74·2	38	e 11 35	− 5	—	—	i 11 55	pP
China Lake		74·3	44	i 11 41	0	—	—	—	—
Haiwee	z.	74·3	44	i 11 42	+ 1	—	—	—	—
Mineral	z.	74·5	39	i 11 43a	+ 1	—	—	—	—
Tinemaha	z.	74·6	43	i 11 44	+ 1	—	—	i 12 3	pP
Reno		75·1	40	e 11 46k	0	—	—	e 14 24	PP
Boulder City		76·3	46	e 11 53	+ 1	—	—	—	—
Overton	z.	76·8	46	i 11 56	+ 1	—	—	—	—
Pierce Ferry		76·9	46	i 11 57	+ 1	—	—	—	—
Tucson		77·2	50	i 11 59	+ 2	—	—	e 12 17	pP
College		83·6	11	i 12 32	+ 1	—	—	i 12 54	pP
Hungry Horse		83·6	36	i 12 31	0	—	—	i 12 40	pP
La Paz		99·4	111	e 13 24	−22	—	—	e 17 24	PP
Pretoria	z.	132·8	208	e 22 43	PKS	—	—	—	—
Collmberg	z.	145·1	354	e 19 41	[+ 2]	—	—	e 21 1?	PP
Jena		145·6	355	e 19 43	[+ 3]	—	—	e 20 4	PKP_2
Paris		147·8	5	e 19 50	[+ 6]	—	—	e 20 9	PKP_2
Stuttgart	z.	147·9	356	e 19 50	[+ 6]	—	—	e 20 9	PKP_2
Strasbourg		148·2	358	e 19 51	[+ 6]	—	—	e 20 10	PKP_2
Tamanrasset	z.	173·9	—	e 20 15	[+ 4]	e 25 38	PP	e 21 38	PKP_2

For Notes see next page.

NOTES TO FEBRUARY 1d. 16h. 50m. 0s.

Additional readings :—
Berkeley eZ =11m.42s. and 11m.50s.
Lick iZ =11m.44s., eZ =11m.51s.
Fresno eZ =11m.54s. and 12m.48s.
Mineral eZ =11m.54s.
Reno eZ =14m.32s.
Tucson e =12m.40s.
Pretoria iZ =22m.46s.
Jena eN =19m.49s., eE =20m.25s.

Feb. 1d. Readings also at 2h. (Ashkabad and College), 3h. (College (2)), 4h. (Stalinabad, near Kulyab, Obi-garm, and near Istanbul), 5h. (Tucson, Boulder City, Shasta Dam, Hungry Horse, and College), 6h. (Kurmenty, near Chilisk, Ili, and Krasnogorka), 7h. (College), 11h. (near Triest), 12h. (Hungry Horse and near Istanbul), 13h. (Chatra and College), 14h. (Pretoria and near Chatra (2)), 15h. (Almata, near Chilisk, Ili, Krasnogorka, Kurmenty, and near Klyuchi), 16h. (Reno), 19h. (Ashkabad, near Chilisk, and Kurmenty (2)), 20h. (Almata I and II, Ili, Krasnogorka, Kulyab, Lunacharskoe, Rybach'e, Samarkand, Tashkent, near Andijan, Chilisk, Fergana, Frunse, Kurmenty (2), Naryn, Obi-garm, Stalinabad, and Tchimkent), 21h. (Tamanrasset), 22h. (Ashkabad and College), 23h. (College, Kizyl-Arvat, and near Ashkabad (2)).

Feb. 2d. 16h. 44m. 34s. Epicentre 48°·0N. 142°·0E.

Strasbourg gives epicentre as adopted.

A = −·5292, B = +·4135, C = +·7409 ; δ = −3 ; h = −4 ;
D = +·616, E = +·788 ; G = −·584, H = +·456, K = −·672.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yuzno-Sakhlinsk		1·2	155	0 6	P_g	0 10	S_g	—	—	—
Vladivostok		8·6	239	e 2 5	− 4	e 3 46	− 2	—	—	—
Kabansk		22·9	295	e 5 13?	+ 7	9 44	SS	—	—	—
Irkutsk		24·3	296	5 24	+ 4	10 0	+23	—	—	—
College		39·9	38	i 7 39	+ 2	e 14 48	+65	i 7 45	?	e 22·2
Almata		44·5	290	e 8 16	+ 1	—	—	—	—	—
Rybach'e		45·5	289	8 29	+ 6	—	—	—	—	—
Chatra		47·3	264	e 8 33	− 4	—	—	e 8 40	P	—
Andijan		48·7	289	e 8 48	0	—	—	—	—	—
Resolute Bay		51·9	16	9 15	+ 3	e 18 44	ScS	e 10 30	PcP	—
Hungry Horse		63·7	46	i 10 35	− 1	—	—	—	—	—
Shasta Dam		64·5	57	e 10 34	− 7	—	—	i 10 37	P	—
Mineral	z.	65·1	57	i 10 43	− 2	—	—	i 10 51	P	—
Reno	z.	66·7	56	e 10 54	− 1	—	—	—	—	—
Fresno	z.	68·6	58	e 11 2	− 5	—	—	—	—	—
Tinemaha	z.	69·3	58	i 11 11	0	—	—	—	—	—
Haiwee	z.	70·1	58	i 11 15	− 1	—	—	—	—	—
China Lake		70·5	58	e 11 16	− 2	—	—	i 11 26	P	—
Pasadena	z.	71·4	59	e 11 20	− 4	—	—	—	—	—
Collmberg	z.	71·9	329	e 13 28	PP	—	—	—	—	—
Boulder City		72·0	56	i 11 26	− 2	—	—	—	—	—
Riverside	z.	72·0	59	e 11 25	− 3	—	—	—	—	—
Pierce Ferry		72·3	55	i 11 28	− 1	—	—	—	—	—
Palomar	z.	72·7	59	i 11 30	− 2	—	—	—	—	—
Stuttgart	z.	75·3	330	e 11 47	0	—	—	—	—	—
Strasbourg		75·9	331	e 11 54?	+ 4	—	—	e 12 4	PcP	—
Tucson		77·0	56	e 11 54	− 2	—	—	i 12 4	PcP	—
Paris		77·4	334	i 12 0	+ 2	—	—	i 12 6	PcP	—
Tacubaya		93·5	56	i 11 29	?	—	—	—	—	—
Tamanrasset	z.	99·4	320	e 17 53	PP	—	—	—	—	—

Resolute Bay gives also eZ =9m.59s.

Feb. 2d. 19h. Undetermined shock.

Manila eP =32m.4s.
Brisbane iPZ =32m.16s., eSEN =36m.50s.
Riverview iZ =33m.59s.
Vladivostok eP =35m.18s., iS =41m.59s.
Chatra iZ =36m.35s., eEN =36m.55s.
Almata eP =38m.16s.
Frunse eP =38m.26s.
Fergana eP =38m.31s.
Andijan eP =38m.31s., eS =48m.5s.
Tashkent eP =38m.34s., eS =48m.20s.
Kulyab eP =38m.45s.
Samarkand eP =38m.54s.
College eP =39m.11s., i =39m.25s.
Shasta Dam eP =40m.10s.
Hungry Horse eP =40m.34s.
Perth i =41m.8s., 42m.53s., and 43m.25s.
Wellington eS? =41m.11s., e =50m.8s., eL =52·5m.
Pierce Ferry eP? =43m.45s.
Overton iPPZ =45m.6s.
Kabansk eS =45m.23s.
Irkutsk eS =45m.35s.
Tamanrasset eZ =45m.49s., ePPZ =48m.6s., eZ =48m.38s.
La Paz ? =46m.11s.
San Juan iPKP =46m.25s., i =46m.37s.
Stalinabad iS =48m.22s.
Sverdlovsk eS =49m.54s.
Christchurch e =50m.
Long waves were also recorded at Ottawa.

Feb. 2d. 21h. 2m. 56s. Epicentre 37°·1N. 141°·8E. Focus at base of superficial layers.
(as on 1950, January 5d.).

Intensity V at Onahama, Mito, Onagawa, Hokoto, and Kasima ; IV at Hukusima, Tokyo, and in numerous other localities. Macroseismic radius greater than 300km. Epicentre 37°·1N. 141°·5E. Depth 40-50km.
Seismo. Bull. Cent. Met. Obs., Japan, February, 1951, Tokyo, 1951, p. 35-36 with macroseismic chart.

$A = -\cdot6283$, $B = +\cdot4944$, $C = +\cdot6006$; $\delta = -9$; $h = -1$;
$D = +\cdot618$, $E = +\cdot786$; $G = -\cdot471$, $H = +\cdot371$, $K = -\cdot800$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Onahama	0·8	257	0 11k	− 4	0 19	− 7	—	—
Hukusima	1·2	302	0 20k	0	0 34	− 2	—	—
Shirakawa	1·3	271	0 20k	− 2	0 32	− 6	—	—
Mito	1·3	236	0 21k	− 1	0 35	− 3	—	—
Sendai	1·3	329	0 22k	0	0 36	− 2	—	—
Inawasiro	1·4	289	0 24k	+ 1	0 44	+ 3	—	—
Tyosi	1·5	209	0 27	+ 3	0 46	+ 2	—	—
Tukubasan	1·6	237	0 25k	− 1	0 43	− 3	—	—
Yamagata	1·6	315	0 25a	− 1	0 41	− 5	—	—
Utunomiya	1·7	250	0 24k	− 4	0 42	− 7	—	—
Mizusawa	2·1	346	0 36	+ 3	0 58	− 1	—	—
Kumagaya	2·1	244	0 32k	− 1	0 46	−13	—	—
Tokyo	2·1	229	0 33	0	0 56	− 3	—	—
Maebasi	2·3	252	0 35k	− 1	0 59	− 5	—	—
Yokohama	2·4	226	0 38a	0	1 4	− 2	—	—
Sakata	2·4	320	0 36	− 2	1 4	− 2	—	—
Titibu	2·5	243	0 36	− 3	1 2	− 7	—	—
Miyako	2·6	3	0 40	− 1	1 8	− 3	—	—
Mera	2·7	216	0 45	+ 3	1 13	− 1	—	—
Oiwake	2·7	254	0 42	0	1 17	+ 3	—	—
Morioka	2·7	349	0 41k	− 1	1 12	− 2	—	—
Takada	2·8	270	0 41	− 2	1 15	− 1	—	—
Hunatu	2·9	237	0 44a	− 1	1 19	0	—	—
Matusiro	2·9	259	0 44	− 1	1 15	− 4	—	—
Nagano	2·9	261	0 43	− 2	1 16	− 3	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Kohu		3·0	241	0 46	0	1 27	+ 5	—	—
Aikawa		3·0	290	0 42	− 4	1 17	− 5	—	—
Misima		3·0	229	0 46	0	1 26	+ 4	—	—
Akita		3·0	334	0 49	+ 3	1 23	+ 1	—	—
Osima		3·1	220	0 50	+ 2	1 22	− 2	—	—
Matumoto		3·2	254	0 49	0	1 31	+ 4	—	—
Shizuoka		3·5	234	0 52	− 1	1 34	0	—	—
Hatinohe		3·5	356	0 54	+ 1	1 38	+ 4	—	—
Omaesaki		3·8	231	1 6	+ 8	1 42	0	—	—
Takayama		3·8	257	0 50	− 8	1 46	+ 4	—	—
Wazima		3·9	277	1 0	+ 1	—	—	—	—
Hamamatu		4·1	235	1 3	+ 1	1 49	0	—	—
Kanazawa		4·2	264	1 13	+10	—	—	—	—
Hatidyozima		4·3	203	1 20 a	+15	1 51	− 3	—	—
Nagoya		4·4	245	1 4	− 2	1 56	− 1	—	—
Gihu		4·4	250	1 7	+ 1	1 58	+ 1	—	—
Hukui		4·6	257	1 7	− 2	—	—	—	—
Ibukiyama		4·7	250	1 19	+ 9	2 4	− 1	—	—
Hikone		4·8	250	1 13	+ 1	1 34	−33	—	—
Tsuruga		4·8	255	1 14	+ 2	2 7	0	—	—
Tu		4·9	243	1 14	+ 1	2 22	+12	—	—
Kameyama		4·9	245	1 16	+ 3	2 23	+13	—	—
Urakawa		5·1	8	1 18	+ 2	2 18	+ 3	—	—
Kyoto		5·3	249	1 19	0	2 15	− 5	—	—
Owase		5·5	239	1 21	− 1	1 53	−32	—	—
Osaka		5·6	247	1 24	+ 1	2 46	+19	—	—
Toyooka		5·8	257	1 26	0	2 28	− 4	—	—
Kobe		5·9	249	1 30	+ 3	2 44	+ 9	—	—
Sapporo		6·0	356	1 33	+ 4	2 44	+ 7	—	—
Sumoto		6·2	247	1 35	+ 3	2 35	− 7	—	—
Nemuro		6·8	24	1 49	+ 9	2 51	− 6	—	—
Abashiri		7·2	14	2 2	+16	—	—	—	—
Muroto		7·3	241	2 50	+63	—	—	—	—
Koti		7·6	245	1 51	0	3 5	−12	—	—
Matuyama		8·1	249	1 58	0	3 48	SS	—	—
Ooita		9·2	249	2 22	+ 9	4 32	+35	—	—
Vladivostok		9·7	312	e 2 18	− 2	e 4 3	− 6	—	—
Hukuoka		9·9	253	2 26 a	+ 3	5 7	SSS	—	—
Saga		10·2	252	2 34	+ 7	5 37	+75	—	—
Kabansk		28·8	312	e 5 57	0	—	—	—	—
Chatra		46·9	273	i 8 19	−10	—	—	e 8 26	P
Chilisk		47·7	300	i 8 39	+ 4	—	—	—	—
Kurmenty		47·9	299	i 8 33	− 4	—	—	—	—
Ili		48·5	301	i 8 38	− 4	—	—	—	—
Almata		48·8	300	8 41	− 3	—	—	—	—
College		48·9	32	i 8 44	− 1	—	—	i 8 57	pP
Frunse		50·6	300	e 8 54	− 4	—	—	—	—
Andijan		52·8	297	e 9 12	− 2	—	—	—	—
Fergana		53·4	297	i 9 15	− 4	—	—	—	—
Lunacharskoe		54·8	299	e 9 33	+ 4	—	—	—	—
Tashkent		54·8	299	i 9 26	− 3	—	—	—	—
Obi-garm		55·5	296	i 9 16	−18	—	—	—	—
Kulyab		55·8	295	e 9 32	− 4	—	—	—	—
Samarkand		57·1	298	e 9 42	− 4	—	—	—	—
Mary		61·6	298	i 10 14	− 2	—	—	—	—
Resolute Bay	z.	62·5	15	10 20	− 2	—	—	10 32	pP
Grozny		69·6	309	e 11 11	+ 3	—	—	—	—
Shasta Dam		70·8	53	i 11 16	+ 1	—	—	—	—
Tiflis		71·0	308	e 11 13	− 3	—	—	—	—
Mineral	z.	71·5	53	e 11 21 a	+ 2	—	—	i 11 32	pP

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Hungry Horse		71·5	42	i 11 20	+ 1	—	—	i 11 33	pP
Abastumanj		72·2	310	e 11 21	− 2	—	—	—	—
Reno	z.	73·1	53	e 11 37	+ 8	—	—	e 11 44	pP
Fresno	z.	74·7	55	e 11 41k	+ 3	—	—	e 11 52	pP
Tinemaha	z.	75·5	54	e 11 48	+ 5	—	—	—	—
Haiwee	z.	76·3	54	e 11 49	+ 2	—	—	—	—
China Lake		76·7	55	i 11 49	− 1	—	—	e 12 2	pP
Logan		76·7	47	e 11 52	+ 2	—	—	—	—
Pasadena	z.	77·3	57	e 11 54	+ 1	—	—	i 12 6	pP
Riverside	z.	77·9	57	e 12 0	+ 4	—	—	e 12 10	pP
Overton	z.	78·3	53	e 11 59	+ 1	—	—	—	—
Boulder City		78·4	53	e 12 1	+ 2	—	—	—	—
Palomar	z.	78·6	57	i 12 7	+ 7	—	—	—	—
Pierce Ferry		78·8	53	i 13 3	+62	—	—	—	—
Collmberg	z.	81·2	331	e 12 12	− 2	—	—	e 12 24	pP
Jena		82·0	331	e 12 16	− 2	—	—	e 12 29	pP
Tucson		83·3	54	e 12 27	+ 2	—	—	e 12 39	pP
Stuttgart	z.	84·7	330	i 12 30a	− 2	—	—	i 12 43	pP
Strasbourg		85·4	331	e 12 34	− 1	—	—	e 12 47	pP
Zürich		86·1	330	e 12 35	− 4	—	—	e 12 49	pP
Basle		86·3	330	e 12 38	− 2	—	—	e 12 51	pP
Paris		87·1	335	i 12 43	− 1	—	—	i 12 56	pP
Besançon		87·2	331	e 12 41	− 3	—	—	e 12 54	pP
Ottawa	z.	91·2	25	e 13 15	pP	—	—	—	—
Tamanrasset	z.	107·6	317	e 18 26	[+ 3]	—	—	e 18 40	PP
Pretoria	z.	123·3	261	i 18 54	[0]	—	—	—	—
La Paz		146·5	60	e 19 32	[− 4]	23 44	PKS	—	—

Additional readings :—
Mineral iZ = 11m.25s.
Fresno eZ = 12m.20s. and 13m.56s.
Collmberg eZ = 12m.38s.
Paris i = 12m.48s., e = 13m.10s., i = 13m.14s.
Besançon e = 13m.9s. and 13m.56s.
Tamanrasset eZ = 18m.55s.

Feb. 2d. 23h. 59m. 16s. Epicentre 37°·0N. 30°·5E. Focus at base of superficial layers.

$A = +\cdot6898$, $B = +\cdot4063$, $C = +\cdot5992$; $\delta = -6$; $h = -1$;
$D = +\cdot508$, $E = -\cdot862$; $G = +\cdot516$, $H = +\cdot304$, $K = -\cdot801$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul	4·2	345	i 2 10	+67	i 2 56?	+64	—	—	—
Ksara	5·4	124	i 1 21	+ 1	i 2 19	− 3	—	—	—
Athens	5·5	282	i 1 27k	+ 5	e 2 38	+13	i 1 52	PP	—
Helwan	7·2	174	1 44	− 2	i 2 56	−11	—	—	—
Sofia	7·9	318	1 59	+ 4	—	—	—	—	e 3·9
Yalta	8·0	19	1 58	+ 1	3 26	− 1	—	—	—
Bucharest	8·1	337	e 2 4	+ 6	—	—	—	—	—
Theodosia	8·8	23	e 2 12	+ 4	—	—	—	—	—
Belgrade	10·9	319	e 2 41a	+ 4	—	—	e 4 4	PS	e 5·4
Taranto	10·9	293	2 51	+14	5 8	+29	—	—	—
Leninakan	11·1	66	2 44	+ 4	—	—	—	—	—
Erevan	11·4	69	2 50	+ 6	—	—	—	—	—
Messina z.	11·9	280	2 56	+ 6	—	—	—	—	e 5·6
Nakhichevan	11·9	75	3 47?	+57	—	—	—	—	—
Grozny	13·3	57	e 3 15	+ 6	—	—	—	—	—
Lwow	13·7	342	—	—	i 6 29	+43	—	—	(i 6·5)
Makhach-Kala	14·3	60	3 24	+ 2	i 6 14	+14	—	—	—
Lenkoran	14·6	77	3 38	+12	—	—	—	—	—
Shemakla	14·6	70	—	—	4 14	?	—	—	—
Rome	14·8	295	3 30a	+ 1	6 20	+ 8	—	—	8·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Baku		15·5	71	e 3 45	+ 7	6 41	+12	—	—	—
Florence		16·1	301	e 3 50	+ 5	e 7 0	+18	—	—	—
Prague		17·4	324	e 4 9	+ 7	e 7 35	+23	e 4 30	pP	—
Pavia		18·0	305	e 4 32	pP	e 5 36	?	—	—	—
Chur		18·4	308	e 4 15	+ 1	—	—	—	—	—
Collmberg	z.	19·0	324	e 4 19	− 3	—	—	—	—	—
Zürich		19·2	309	e 4 22	− 2	e 7 38	−15	—	—	—
Jena		19·4	323	e 4 24	− 2	e 7 54	− 3	e 4 47	pP	—
Moscow		19·4	11	e 4 23	− 3	e 7 57	0	—	—	—
Stuttgart		19·5	315	i 4 24 a	− 3	e 7 56	− 4	e 4 37	pP	—
Basle		19·9	310	e 4 32	+ 1	—	—	—	—	—
Karlsruhe	z.	20·0	315	e 4 33	+ 1	—	—	—	—	—
Neuchatel		20·1	309	e 4 31	− 3	e 8 38	SS	—	—	—
Strasbourg		20·2	313	i 4 34 a	− 1	—	—	i 4 53	pP	—
Besançon		20·8	308	e 4 37	− 4	—	—	i 4 54	pP	—
Algiers Univ.	z.	22·0	277	e 4 49	− 4	—	—	e 5 7	pP	—
Copenhagen		22·3	333	i 5 9	+13	—	—	—	—	—
Pulkovo		22·8	359	e 5 0	− 1	e 9 0	− 3	—	—	—
Helsinki	N.	23·5	353	e 5 34	pP	i 9 21	+ 5	—	—	e 9·9
Paris		23·5	309	i 5 6	− 2	i 5 37	PP	i 5 26	pP	—
Tortosa		23·6	288	5 31	pP	10 5	?	6 24	PP	—
Upsala		24·3	343	i 5 42	pP	i 9 35	+ 6	—	—	—
Mary		24·9	79	i 5 21	0	—	—	—	—	—
Tamanrasset	z.	25·8	244	i 5 28 a	− 2	e 10 0	+ 6	i 5 51	pP	—
Almeria		26·3	280	e 4 42	−52	—	—	—	—	—
Toledo		27·1	287	i 5 39	− 3	—	—	e 6 0	pP	—
Sverdlovsk		28·2	34	6 13	pP	—	—	—	—	—
Tashkent		30·2	69	e 6 27	pP	12 7	+62	—	—	—
Tchimkent		30·4	67	e 6 6	− 5	—	—	—	—	—
Fergana		32·2	70	e 6 22	− 5	—	—	—	—	—
Andijan		32·6	70	6 27	− 4	—	—	—	—	—
Frunse		34·0	65	e 6 41	− 2	—	—	—	—	—
Ili		35·7	62	6 53	− 4	—	—	—	—	—
Scoresby Sund		43·3	337	e 8 24	pP	—	—	—	—	—
Chatra		48·5	84	e 8 36	− 6	e 15 28	−11	—	—	—
Resolute Bay		63·0	346	10 21	− 5	e 18 46	− 6	i 10 45	pP	—
Grahamstown	z.	70·0	183	i 11 7	− 3	—	—	—	—	—
Ottawa	z.	74·5	315	e 11 32	− 5	—	—	e 11 56	pP	—
College		78·5	0	i 11 55	− 4	—	—	—	—	—
Hungry Horse		89·3	337	i 12 50	− 4	—	—	i 13 13	pP	—
Pierce Ferry		100·1	331	e 13 41	− 3	—	—	—	—	—
Boulder City		100·6	332	e 13 38	− 8	—	—	—	—	—

Additional readings :—
Athens i =1m.55s.
Helwan iZ =1m.56s. and 2m.35s.
Bucharest iN =3m.47s., iE =3m.54s. and 4m.25s., iN =4m.33s.
Belgrade eZ =3m.4s.
Messina eZ =3m.8s.
Florence i =4m.21s., e =7m.29s.
Prague eN =4m.23s., esPN =4m.35s., e =4m.51s., 5m.50s., and 6m.42s., esS =8m.15s.
Chur e =4m.45s.
Collmberg eZ =4m.41s. and 5m.18s.
Jena eEN =4m.57s., eN =5m.47s., eS?E =7m.59s., eSN =8m.6s.
Stuttgart eZ =4m.48s. and 4m.56s., i =5m.5s., eZ =5m.8s. and 5m.32s., eS =8m.5s.
Strasbourg i =4m.42s., isP? =5m.3s., i =5m.33s. and 5m.56s.
Besançon esP? =5m.5s., e =5m.28s., 5m.47s., and 6m.24s.
Algiers Univ. eZ =4m.58s., iPPZ =5m.13s., eZ =5m.41s. and 6m.33s.
Paris e =5m.15s. and 5m.20s., isP? =5m.45s., iPPP =5m.51s.
Tortosa PN =5m.38s.
Tamanrasset esPZ =6m.0s., epS?Z =10m.20s.

Feb. 2d. Readings also at 0h. (near Chatra), 1h. (Grahamstown (2), Pietermaritzburg, Pretoria (2), Tananarive, and Tamanrasset), 2h. (Pretoria, Apia, Abastumanj, Borzhoni, near Gandzha, Stepanavan, and Tsikhlis-Dzhvari), 3h. (Almata II, Baku, Fergana, Ili, Kirovobad, near Andijan, Tchimkent, near Klyuchi, near Lenkoran, Shemakha, Nakhichevan, and near Bogota), 4h. (Pretoria and College), 5h. (Stalinabad, Andijan, Samarkand, Frunse, near Ashkabad, near Khorog, Kulyab, and Obi-garm), 7h. (near Balboa Heights and near Kurmenty), 8h. (Merida, Tacubaya, and near Ashkabad), 9h. (near Ashkabad), 11h. (Mount Wilson, China Lake, Tinemaha, Pierce Ferry (2), Tucson (2), Boulder City, Mineral, Shasta Dam (2), Lick, Overton (2), Hungry Horse (2), College (2), Chatra, and Pretoria), 12h. (Tacubaya (3), Merida, and Tucson), 13h. (Collmberg, College, Hungry Horse, Overton, Boulder City, and Pierce Ferry), 15h. (near Puebla, Vera Cruz, Tacubaya, near Almata, Almata II, Andijan, Chilisk, Fergana, Frunse, Ili, Khorog, Krasnogorka, Kurmenty (2), Naryn, Rybach'e Samarkand, Stalinabad, Tashkent, and Tchimkent), 16h. (College, Granada, Kulyab, Chilisk, Almata, near Almata II, Kurmenty, and Naryn), 17h. (Berkeley, Lick, near Balboa Heights, Manila, Bombay, and near Kurmenty), 18h. (College, Merida, Tacuabya, China Lake, Mount Wilson, Pierce Ferry, Boulder City, Overton, La Paz, Hungry Horse, Vladivostok, and near Yuzno-Sakhlinsk), 19h. (near Dzhergetal), 20h. (near Santa Clara, near Manila, Kulyab, Fergana, near Khorog (2), Obi-garm, and Dzhergetal), 22h. (College), 23h. (Chatra).

Feb. 3d. Readings also at 0h. (Overton (2), Pierce Ferry, and near Dzhergetal), 2h. (Apia, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, and near Kabansk), 4h. (Triest, Mount Wilson, China Lake, Boulder City, Pierce Ferry, and Lick), 6h. (Pierce Ferry and Chatra), 7h. (College and near Dzhergetal (2)), 9h. (Tucson, Almata II, and near Kurmenty), 12h. (Manila, Ili, near Chilisk, and Kurmenty), 13h. (Overton, College, Ashkabad, Frunse, Lunacharskoe, Naryn, Tashkent, Tchimkent, near Andijan, Dzhergetal, Fergana, Khorog, Kulyab, Obi-garm, Samarkand, and Stalinabad), 14h. (Overton, Pierce Ferry, Tucson, College, Collmberg, Ashkabad, Andijan, Fergana, Lunacharskoe, Samarkand, near Dzhergetal, Kulyab, Obi-garm, and Stalinabad), 15h. (Overton, Hungry Horse, and College), 16h. (Yuzno-Sakhlinsk), 19h. (near Dzhergetal and Stalinabad), 20h. (near Kizyl-Arvat, and near Almata II), 21h. (Santa Clara and College), 22h. (China Lake, Pierce Ferry, College, and near Dzhergetal), 23h. (near Dzhergetal).

Feb. 4d. 15h. 37m. 19s. Epicentre 19°·0S. 176°·0W. Depth of focus 0·030.

(as on 1948, July 3d.).

Epicentre given by Pasadena.

$A = -\cdot 9439$, $B = -\cdot 0660$, $C = -\cdot 3236$; $\delta = +2$; $h = +5$;
$D = -\cdot 070$, $E = +\cdot 998$; $G = +\cdot 323$, $H = +\cdot 023$, $K = -\cdot 946$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		6·6	39	i 1 36	0	i 2 44	− 7	—	—
Wellington		23·6	198	e 4 51	− 1	e 8 37	−10	—	—
Cobb River	E.	24·0	202	—	—	e 8 54	0	—	—
Kaimata	N.E.	25·8	202	i 5 10	− 2	e 9 28	+ 5	—	—
Christchurch		26·3	199	e 5 18	+ 1	e 9 22	− 9	—	—
Brisbane	Z.	29·6	247	i 5 45	− 1	—	—	—	—
Pasadena	Z.	76·3	46	i 11 26a	0	—	—	—	—
Palomar	Z.	76·7	47	i 11 30a	+ 2	—	—	—	—
Fresno	Z.	76·7	43	e 11 29a	+ 1	—	—	—	—
Riverside	Z.	76·8	46	i 11 29a	+ 1	—	—	—	—
China Lake	Z.	77·6	45	i 11 34a	+ 1	—	—	i 11 57	pP
Mineral	Z.	77·7	40	i 11 35k	+ 2	—	—	—	—
Tinemaha	Z.	77·9	44	i 11 36a	+ 2	—	—	i 12 3	pP
Reno		78·4	41	e 11 39a	+ 2	—	—	e 12 20	pP
Boulder City		79·6	46	i 11 46	+ 2	—	—	—	—
Overton	Z.	80·1	46	i 11 49	+ 3	—	—	—	—
Pierce Ferry		80·2	47	i 11 49	+ 2	—	—	i 12 44	pP
Tucson		80·5	51	i 11 51	+ 3	—	—	—	—
Victoria	Z.	81·9	32	i 11 57a	+ 1	—	—	—	—
Logan		84·6	42	e 12 6	− 3	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
College		86·4	12	i 12 19	+ 1	—	—	e 13 18	pP
Hungry Horse		86·8	36	i 12 22	+ 2	—	—	—	—
Collmberg	Z.	147·0	351	e 19 19	[+ 5]	—	—	e 20 16	pPKP
Jena	N.	147·6	352	e 19 16	[+ 1]	—	—	—	—
Prague		147·9	348	e 19 16	[+ 1]	e 19 38	PKP_2	e 20 20	pPKP
Ksara		148·0	304	e 20 20	pPKP	e 31 35	?	—	—
Stuttgart	Z.	150·0	353	e 19 19	[0]	—	—	e 20 22	pPKP
Paris		150·2	3	i 19 28	[+ 9]	—	—	—	—
Strasbourg		150·3	356	i 19 27	[+ 8]	—	—	—	—
Tamanrasset	Z.	176·0	340	e 19 46	[+ 3]	e 25 31	PP	e 20 47	pPKP

Additional readings :—
Apia i = 1m.53s. and 1m.56s.
China Lake eZ = 12m.28s.
Mineral eZ = 12m.31s.
Reno eN = 12m.31s.
Prague epPKP_2 = 20m.39s., esPKP_2 = 21m.5s., ePP? = 23m.4s.
Stuttgart eZ = 19m.26s.
Tamanrasset esPKP_2Z = 21m.28s.

Feb. 4d. Readings also at 1h. (Fergana, near Dzhergetal, Khorog, Kulyab, Obi-garm, and Stalinabad), 6h. and 7h. (College), 8h. (Overton, Pierce Ferry, College, and Tamanrasset), 9h. (College (2) and Chatra), 11h. (Huancayo, Alicante, and near Klyuchi), 13h. (Overton), 14h. (near Seven Falls and near Athens), 15h. (Prague and near Ashkabad), 16h. (Lick, College, Collmberg, Erevan, Gori, Leninakan, near Abastumanj, Borzhomi, Gandzha, Stepanavan, Tiflis, and Tsikhlis-Dzhvari), 17h. (Dzhergetal, Khorog, near Ashkabad, Kizyl-Arvat, Kulyab, Mary, and near Obi-garm), 18h. (College (2)), 19h. (Brisbane, Mount Wilson, China Lake, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Lick, Mineral, College, and Collmberg), 20h. (Wellington, Pierce Ferry, and near Huancayo), 22h. (Apia, Chatra, Mount Wilson, Riverside, China Lake, Tucson, Pierce Ferry, Stuttgart, Tamanrasset, and near Dzhergetal), 23h. (Tamanrasset).

Feb. 5d. Readings at 0h. (Chilisk, near Istanbul, and near Dzhegetal), 2h. (College and near Balboa Heights), 3h. (College), 4h. (College, Sofia, and near Belgrade), 5h. (Apia, Wellington, China Lake, Tinemaha, Tucson, Overton, Pierce Ferry, Hungry Horse, College, and Collmberg), 6h. (Pietermartizburg and Pretoria), 7h. (College), 9h. (Tucson, Overton, Pierce Ferry, Hungry Horse, College, Samarkand, Stalinabad, Tashkent, near Andijan, Dzhergetal, Fergana, Frunse, Ili, Krasnogorka, Lunacharskoe, Naryn, Obi-garm, Rybach'e, Tchimkent, and near Kurmenty), 10h. (College, Zürich, and near Obi-garm), 11h. and 12h. (College), 13h. (Apia, Kaimata, Tuai, Wellington, China Lake, Tucson, Overton, Pierce Ferry, Kulyab, near Dzhergetal, Khorog, and near Lisbon), 14h. (College (2)), 16h. (Collmberg, Kulyab, Samarkand, near Dzhergetal, and Khorog), 17h. (Apia, College, near Dzhegetal, and Obi-garm), 18h. (Tinemaha, Tucson, Overton, Pierce Ferry, and College), 19h. (Manila and College), 20h. (La Paz and Pretoria), 21h. (College), 22h. (Pierce Ferry, Lick, Mineral, Shasta Dam, Hungry Horse, and Scoresby Sund), 23h. (Scoresby Sund).

Feb. 6d. 6h. 6m. 10s. Epicentre 57°·7N. 154°·1W.

$A = -·4830$, $B = -·2345$, $C = +·8436$; $\delta = -6$; $h = -8$;
$D = -·437$, $E = +·900$; $G = -·759$, $H = -·368$, $K = -·537$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
College		7·8	20	e 1 57	− 1	e 3 25	− 3	—	—	e 4·1
Victoria	Z.	20·4	102	e 4 40	− 1	—	—	—	—	—
Seattle		21·5	102	e 5 5	+13	—	—	i 5 28	PPP	—
Hungry Horse		25·5	92	i 5 30	− 2	—	—	—	—	—
Shasta Dam		26·5	114	i 5 38	− 3	—	—	—	—	—
Mineral	Z.	27·1	114	i 5 44a	− 2	—	—	i 6 8	?	—
Resolute Bay	Z.	27·6	28	5 28	−23	—	—	—	—	—
Reno	Z.	28·6	112	e 5 58	− 2	—	—	e 6 6	?	—
Lick	Z.	29·5	117	e 6 12	+ 4	—	—	—	—	—
Tinemaha	Z.	31·3	114	e 6 23	− 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
China Lake		32·6	114	e 6 32	− 3	—	—	—	—	—
Overton	z.	33·6	110	i 6 43	− 1	—	—	—	—	—
Mount Wilson	z.	33·7	116	e 6 42	− 3	—	—	—	—	—
Boulder City		33·9	111	e 6 46	− 1	—	—	—	—	—
Pierce Ferry		34·2	110	i 6 47	− 2	—	—	—	—	—
Riverside	z.	34·2	116	e 6 46	− 3	—	—	—	—	—
Palomar	z.	35·0	116	e 6 53	− 3	—	—	e 7 3	?	—
Tucson		38·8	110	e 7 27	− 1	—	—	—	—	—
Harvard		51·7	67	e 8 20	−51	—	—	—	—	—
Weston		51·9	67	i 9 10	− 2	—	—	—	—	—
Collmberg	z.	70·9	8	e 11 19	− 2	—	—	—	—	—
Stuttgart	z.	73·0	11	e 11 34	+ 1	—	—	—	—	—
Pretoria	z.	148·0	356	e 19 34	[−10]	—	—	i 19 37	PKP_2	—

Long waves were also recorded at Seven Falls.

Feb. 6d. 16h. 33m. 12s. (I) } Epicentre 40°·3N. 126°·6W.
17h. 6m. 36s. (II) } (as on 1937, March 26d.).

$A = -·4560$, $B = -·6140$, $C = +·6443$; $\delta = +5$; $h = -2$;
$D = -·803$, $E = +·596$; $G = -·384$, $H = -·517$, $K = -·765$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I Arcata		2·0	73	e 0 35a	0	e 1 0	− 2	—	—	—
II	N.	2·0	73	—	—	e 1 9	S_g	—	—	—
I Shasta Dam		3·2	81	i 0 52	0	i 1 32	0	—	—	—
II		3·2	81	i 0 51	− 1	e 1 31	− 1	e 1 22	?	—
I Mineral	E.	3·8	87	e 1 1	0	e 1 44	− 3	—	—	—
I Berkeley		4·1	125	e 1 4a	− 1	i 1 56	+ 1	i 1 10	P*	—
II		4·1	125	e 1 3k	− 2	e 1 58	+ 3	—	—	e 3·6
I San Francisco	N.	4·1	127	e 1 5	0	e 1 56	+ 1	—	—	—
II	N.	4·1	127	e 1 4	− 1	e 1 54	− 1	—	—	—
II Branner	N.	4·5	128	e 1 8	− 3	e 2 5	0	—	—	—
I Lick	z.	4·8	125	e 1 14k	− 1	i 2 13	+ 1	i 2 8	S	—
II	z.	4·8	125	i 1 14a	− 1	i 2 12	0	—	—	—
I Reno	z.	5·3	96	e 1 33	P*	—	—	—	—	—
II	E.	5·3	96	e 1 40	P_g	—	—	—	—	—
II Tinemaha	z.	7·2	113	i 1 53	+ 4	—	—	—	—	—
I China Lake	z.	8·4	119	i 2 5a	− 1	—	—	—	—	—
II	z.	8·4	119	e 2 4	− 2	—	—	—	—	—
I Mount Wilson	z.	9·1	129	e 2 13	− 1	—	—	—	—	—
I Boulder City		10·2	111	e 2 34	+ 3	—	—	—	—	—
II		10·2	111	e 2 34	+ 3	—	—	—	—	—
I Overton	z.	10·3	108	i 2 35	+ 3	—	—	—	—	—
I Pierce Ferry		10·8	109	i 2 41	+ 2	—	—	—	—	—
II		10·8	109	i 2 40	+ 1	—	—	—	—	—
I Hungry Horse		12·1	44	e 2 53	− 4	—	—	—	—	—
II		12·1	44	e 2 51	− 6	—	—	—	—	—
I Tucson		15·0	117	e 3 37	+ 2	—	—	—	—	—
II		15·0	117	e 3 36	+ 1	—	—	—	—	—

Feb. 6d. Readings also at 0h. (Tamanrasset, Scoresby Sund, and near Dzhergetal), 1h. (Overton, Nanking, College, Hungry Horse, and Shasta Dam), 2h. (College (2) and Mizusawa), 4h. (Hungry Horse, Reno, and near Dzhergetal), 5h. (Hungry Horse, Logan, Obi-garm, Kulyab, and near Dzhergetal), 8h. (Hungry Horse and near Dzhergetal), 9h. (Hungry Horse), 11h. (College), 12h. (College, Hungry Horse, near Andijan, and Dzhergetal), 13h. (College, Boulder City, Overton, Pierce Ferry, and Logan), 14h. (Reno, Naryn, Almata, Andijan, Chilisk, near Frunse, Krasnogorka, Almata II, Ili, and Kurmenty), 15h. (Bombay and College), 16h. (College), 18h. (Chatra (2), Apia, Obi-garm, Fergana, Samarkand, near Stalinabad, Khorog, Andijan, and near Ottawa), 19h. (Tamanrasset and near Ottawa), 20h. (Pretoria), 21h. (near Tacubaya), 23h. (College, Pierce Ferry, and near Resolute Bay).

Feb. 7d. 3h. 38m. 48s. Epicentre 31°·2N. 140°·4E. Depth of focus 0·010.

Intensity IV at Torishima, Miyagi Prefecture, and Watari. Epicentre as adopted.

Seismo. Bull. Cent. Obs., Japan, 1951. Tokyo, 1951, p.37.

$A = -·6603$, $B = +·5462$, $C = +·5155$; $\delta = +7$; $h = +1$;
$D = +·637$, $E = +·771$; $G = -·397$, $H = +·329$, $K = -·857$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Torishima	0·8	191	0 19a	+ 1	0 33	+ 1	—	—	—
Hatidyosima	2·0	346	0 33	0	0 57	0	—	—	—
Mera	3·8	352	0 58	0	1 36	− 6	—	—	—
Omaesaki	3·8	331	1 0	+ 2	1 45	+ 3	—	—	—
Misima	4·1	343	1 1	− 1	1 47	− 2	—	—	—
Hamamatu	4·2	328	1 4	+ 1	1 49	− 2	—	—	—
Yokohama	4·3	351	1 5	0	—	—	—	—	—
Hunatu	4·5	342	1 8a	+ 1	2 1	+ 2	—	—	—
Owase	4·5	310	1 8k	+ 1	1 59	0	—	—	—
Siomisaki	4·5	301	1 8k	+ 1	2 0	+ 1	—	—	—
Tokyo	4·5	353	1 5	− 2	1 56	− 3	—	—	—
Kohu	4·7	341	1 12	+ 2	2 8	+ 4	—	—	—
Iida	4·8	334	1 2	− 9	1 56	−10	—	—	—
Kameyama	4·9	319	1 13	0	2 10	+ 1	—	—	—
Nagoya	4·9	325	1 14a	+ 1	2 8	− 1	—	—	—
Titibu	4·9	347	1 21	+ 8	2 10	+ 1	—	—	—
Kumagaya	5·0	350	1 12	− 2	2 4	− 7	—	—	—
Tukubasan	5·0	357	1 11	− 3	2 5	− 6	—	—	—
Gihu	5·2	325	1 16	− 1	2 15	− 1	—	—	—
Mito	5·2	0	1 15	− 2	2 10	− 6	—	—	—
Hikone	5·3	320	1 22	+ 4	2 18	0	—	—	—
Ibukiyama	5·3	322	1 19	+ 1	2 19	+ 1	—	—	—
Maebasi	5·3	348	1 16	− 2	2 22	+ 4	—	—	—
Osaka	5·3	311	1 21k	+ 3	2 22	+ 4	—	—	—
Utunomiya	5·3	355	1 15	− 3	2 12	− 6	—	—	—
Wakayama	5·3	306	1 20	+ 2	2 20	+ 2	—	—	—
Kyoto	5·4	315	1 22k	+ 2	2 21	0	—	—	—
Matumoto	5·4	338	1 25	+ 5	2 27	+ 6	—	—	—
Kobe	5·6	310	1 24k	+ 2	2 27	+ 1	—	—	—
Matusiro	5·6	342	1 28	+ 6	2 38	+12	—	—	—
Sumoto	5·6	305	1 32k	+10	2 35	+ 9	—	—	—
Takayama	5·6	333	1 29	+ 7	2 28	+ 2	—	—	—
Muroto	5·7	293	1 23	− 1	2 28	0	—	—	—
Nagano	5·8	342	1 26	+ 1	2 27	− 4	—	—	—
Onahama	5·8	4	1 22	− 3	2 21	−10	—	—	—
Tsuruga	5·8	322	1 26a	+ 1	2 30	− 1	—	—	—
Hukui	5·9	325	1 39	+13	—	—	—	—	—
Shirakawa	5·9	358	1 25	− 1	2 26	− 7	—	—	—
Toyama	6·1	335	1 36	+ 7	2 47	+ 9	—	—	—
Koti	6·2	294	1 32	+ 2	2 43	+ 2	—	—	—
Takada	6·2	343	1 34	+ 4	2 33	− 8	—	—	—
Takamatu	6·2	302	1 33	+ 3	3 5	+24	—	—	—
Kanazawa	6·2	330	1 46	+16	2 56	+15	—	—	—
Inawashiro	6·3	358	1 29	− 3	2 36	− 7	—	—	—
Toyooka	6·4	314	1 33k	0	2 45	− 1	—	—	—
Hukusima	6·5	0	1 32	− 3	2 40	− 8	—	—	—
Simidu	6·5	286	1 33	− 2	2 44	− 4	—	—	—
Wazima	6·8	336	1 53	+14	—	—	—	—	—
Aikawa	7·0	346	1 38	− 4	2 53	− 7	—	—	—
Matuyama	7·0	294	1 42k	0	3 1	+ 1	—	—	—
Sendai	7·0	3	1 40	− 2	2 49	−11	—	—	—
Hirosima	7·4	297	1 47	0	3 9	− 1	—	—	—
Miyazaki	7·7	278	1 54k	+ 3	3 17	0	—	—	—
Ooita	7·7	287	1 54a	+ 3	3 34	+17	—	—	—
Hamada	7·9	300	1 55	+ 1	3 29	+ 7	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa		7·9	4	1 53	− 1	3 10	−12	—	—	—
Kagosima		8·4	275	2 3k	+ 3	3 56	+22	—	—	—
Kumamoto		8·4	283	2 4	+ 4	3 38	+ 4	—	—	—
Akita		8·5	358	2 1	− 1	3 30	− 7	—	—	—
Miyako		8·5	8	1 57	− 5	3 24	−13	—	—	—
Morioka		8·5	4	1 53	− 9	3 24	−13	—	—	—
Yakusima		8·5	268	2 6	+ 4	—	—	—	—	—
Hukuoka		8·8	288	2 8	+ 2	3 49	+ 5	—	—	—
Saga		8·8	286	2 11k	+ 5	—	—	—	—	—
Unzendake		8·8	283	2 5	− 1	—	—	—	—	—
Aomori		9·6	2	1 45	−32	—	—	—	—	—
Urakawa		11·1	9	2 26	−11	4 32	− 8	—	—	—
Sapporo		11·9	3	1 30	?	—	—	—	—	—
Guam		18·1	168	4 37	+31	—	—	—	—	—
Nanking		18·4	278	4 8k	− 2	i 7 32	+ 4	i 4 36	pP	i 8·2
Manila		24·3	232	e 5 5	− 4	—	—	—	—	—
Kabansk		32·3	320	e 6 16	− 6	e 11 16	−11	—	—	—
Irkutsk		33·7	320	e 6 31	− 3	11 47	− 2	—	—	—
Ili		50·6	304	e 8 46	− 5	—	—	—	—	—
College		54·5	30	e 9 17	− 3	i 16 44	− 6	i 9 45	pP	e 23·0
Andijan		54·7	300	e 9 17	− 4	i 16 49	− 3	—	—	—
Fergana		55·2	300	e 9 20	− 5	e 16 52	− 7	—	—	—
Tashkent		56·8	302	e 9 34	− 2	i 17 16	− 4	—	—	—
Obi-garm		57·1	299	e 9 38	− 1	17 25	+ 1	—	—	—
Kulyab		57·3	298	e 9 37	− 3	e 17 24	− 3	—	—	—
Sverdlovsk		59·1	321	9 50	− 2	17 46	− 4	—	—	—
Resolute Bay		68·5	13	10 50	− 4	19 43	− 4	e 11 17	pP	—
Baku		70·9	307	—	—	e 20 20	+ 5	—	—	—
Victoria	z.	71·1	44	i 11 9a	− 1	—	—	—	—	—
Seattle		72·2	45	e 11 17a	+ 1	—	—	e 11 43	pP	—
Grozny		72·4	310	e 11 9	− 8	—	—	—	—	—
Tiflis		73·8	309	e 11 23	− 3	e 20 44	− 4	—	—	—
Borzhomi		74·7	310	e 11 31	0	20 56	− 2	—	—	—
Abastumanj		75·1	310	e 11 30?	− 3	—	—	—	—	—
Shasta Dam		75·3	51	i 11 33	− 1	—	—	—	—	—
Mineral	z.	76·0	51	i 11 37a	− 1	—	—	i 11 58	pP	—
Hungry Horse		76·7	41	i 11 41	− 1	—	—	—	—	—
Berkeley	z.	76·8	53	11 41a	− 2	e 14 38	PP	i 12 10	pP	e 35·0
Lick	z.	77·5	53	i 11 45a	− 2	—	—	i 12 14	pP	—
Reno		77·6	51	e 11 47a	0	e 14 23	PP	e 12 16	pP	—
Scoresby Sund		77·8	355	i 11 48	0	—	—	—	—	—
Fresno	z.	79·1	53	e 11 54a	− 1	—	—	e 12 6	pP	—
Tinemaha	z.	79·9	53	i 11 59a	− 1	—	—	i 12 28	pP	—
China Lake	z.	81·1	54	i 12 5a	− 1	—	—	—	—	—
Pasadena		81·5	55	i 12 6a	− 2	—	—	—	—	—
Logan		81·6	46	i 12 9	0	—	—	—	—	—
Mount Wilson	z.	81·6	55	i 12 7a	− 2	—	—	i 12 32	pP	—
Riverside	z.	82·2	55	i 12 10a	− 2	—	—	i 12 36	pP	—
Copenhagen		82·7	334	i 12 13	− 1	—	—	—	—	—
Overton	z.	82·8	52	i 12 15	0	—	—	i 15 26	PP	—
Boulder City		82·9	52	i 12 15	0	—	—	e 15 24	PP	—
Palomar	z.	82·9	55	i 12 14a	− 1	—	—	—	—	—
Pierce Ferry		83·3	52	i 12 17	0	e 22 30	+ 2	i 15 29	PP	—
Istanbul	z.	84·2	315	e 12 19	− 3	—	—	—	—	—
Collmberg	z.	85·7	329	e 12 27	− 2	e 15 47	PP	e 12 49	pP	—
Jena	N.	86·6	330	e 12 34	0	—	—	—	—	—
Tucson		87·7	53	e 12 39	0	e 13 19	sP	e 16 26	PP	—
Helwan	N.	89·3	305	—	—	e 23 2	[− 4]	e 23 22	S	—
Stuttgart	z.	89·3	330	e 12 43	− 3	—	—	e 16 14	PP	—
Strasbourg		90·0	331	e 12 49	− 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Besançon		91·8	331	e 12 57	− 1	—	—	—	—	—
Ottawa	z.	97·0	24	e 13 20	− 2	—	—	—	—	—
Harvard		101·0	23	e 13 39	− 1	—	—	—	—	e 55·4
Tamanrasset	z.	111·1	315	18 31	[+ 9]	—	—	e 18 52	pPKP	—
Bogota		131·5	48	i 19 0	[− 1]	e 22 16	SKP	e 21 22	PP	—
La Paz		150·2	66	i 19 42	[+ 8]	—	—	e 23 23	PP	—

Additional readings :—
College esS =17m.27s., eSS =20m.44s.
Resolute Bay eZ =11m.31s., e =20m.13s. and 20m.43s.
Seattle e=11m.23s., ePcP=11m.29s., esP=11m.55s., e=12m.2s., 12m.28s., and 12m.43s.
Berkeley iZ =11m.49s. and 12m.2s.
Lick iZ =11m.52s.
Reno eZ =12m.4s., eN =12m.56s., eE =13m.20s.
Fresno eZ =12m.38s.
Logan i =13m.38s.
Tamanrasset ePPZ =19m.44s.
La Paz i =20m.44s.

Feb. 7d. 6h. 24m. 31s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·030.
(as on 1951, Jan. 16d.).

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Khorog	1·2	48	0 34	0	0 58	− 2	—	—
Kulyab	1·3	335	e 0 35	0	i 0 59	− 2	—	—
Obi-garm	2·1	342	i 0 43	+ 1	i 1 13	− 1	—	—
Dzhergetal	2·6	12	i 0 47	0	i 1 21	− 2	—	—
Fergana	3·8	15	i 1 2	+ 1	i 1 48	0	—	—
Samarkand	4·1	319	—	—	i 1 52	− 2	—	—
Andijan	4·3	20	e 1 9	+ 2	i 2 0	+ 1	—	—
Lunacharskoe	4·7	349	i 1 13	+ 1	i 2 8	0	—	—
Tashkent	4·7	349	i 1 13	+ 1	2 7	− 1	—	—
Tchimkent	5·6	354	i 1 25	+ 2	i 2 28	0	—	—
Naryn	6·4	41	e 1 30	− 3	e 2 39	− 7	—	—
Frunse	6·9	26	i 1 41	+ 1	—	—	—	—
Mary	6·9	280	i 1 37	− 3	i 2 55	− 3	—	—
Rybach'e	7·2	35	—	—	e 3 10	+ 5	—	—
Almata	8·2	35	i 1 57	0	—	—	—	—
Ashkabad	9·8	281	i 2 15	− 2	4 1	− 4	—	—
New Delhi	9·8	143	e 2 14	− 3	i 3 54	−11	4 15	SSS
Kizyl-Arvat	11·5	286	2 37	− 2	—	—	—	—
Chatra	17·2	120	e 3 47	− 1	—	—	—	—
Poona z.	18·3	170	i 3 57	− 3	—	—	—	—
College	74·4	17	e 11 16	+ 1	—	—	—	—

New Delhi gives also S*E =4m.26s.

Feb. 7d. Readings also at 0h. (Christchurch, Wellington, Brisbane (2), Riverview (2), Bandong, Mount Wilson, Palomar (2), Riverside, China Lake (2), Tinemaha (2), Overton (2), Pierce Ferry (2), Hungry Horse, College (2), Pretoria, Paris, Jena, Collmberg (2), Strasbourg, Stuttgart (2), and Tamanrasset (2)), 1h. (Palomar, Riverside, China Lake, Tucson, Boulder City, Overton, Pierce Ferry, Merida, Vera Cruz, near Oaxaca, Puebla, and Tacubaya), 2h. (Hungry Horse, and near Almata II), 4h. (Hungry Horse), 7h. (Copenhagen, Collmberg, Ksara, and Tamanrasset), 8h. (near Tacubaya), 10h. (Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Hungry Horse, College, Ashkabad, and near Klyuchi), 11h. (near Istanbul, near Kluychi (2), and near Yalta), 12h. (Hungry Horse, Overton, Pierce Ferry, Ashkabad, and near Klyuchi), 14h. (Collmberg and near Dzhergetal), 15h. (Pierce Ferry, Collmberg, Andijan, Chilisk, Ili, Kurmenty, and near Dzhergetal), 16h. (College and near Istanbul), 17h. (College, Almata II, near Chilisk, Ili, and Kurmenty), 18h. (Pierce Ferry, Hungry Horse, near Victoria, and near Dzhergetal), 19h. (Pierce Ferry, near Overton, and near Dzhergetal), 21h. (Pierce Ferry, near Dzhergetal, near Istanbul, and near Mizusawa), 22h. (near Bogota, Tacubaya, Riverside, China Lake, Overton, Pierce Ferry, Hungry Horse, Victoria, near College, and near Balboa Heights), 23h. (Hungry Horse and Grahamstown).

Feb. 8d. 10h. South-West Pacific.

Apia iPEN =40m.27s., iE =41m.11s., eSEN =42m.58s.
Wellington eP =42m.53s., ePP? =43m.8s., e =45m.9s. and 45m.46s., eSS?Z =47m.34s., LZ =49·2m.
Brisbane ePZ =43m.56s., iPP?E =44m.57s., eE =49m.25s.
Riverview ePZ =44m.19s., iPZ =44m.24s., iPPE =45m.21s., iPPZ =45m.24s., ePPPZ =45m.35s., eS?N =49m.19s., eLZ =53·0m.
Tuai eS?N =44m.41s.
Cobb River eS?E =46m.6s.
Kaimata eS?NE =46m.42s.
Christchurch eS? =47m.0s., eRZ =49m.5s.
Berkeley ePZ =50m.6s., eZ =50m.20s. and 50m.42s., eScS?E =60m.14s., eRZ =78·2m.
Lick ePZ =50m.6s.k, iZ =50m.34s.
Pasadena iPZ =50m.7s., eLEN =74m.
Riverside ePZ =50m.8s.
Palomar iPZ =50m.9s.
Fresno ePZ =50m.10s.a, eZ =50m.32s., eE =51m.38s.
China Lake iPZ =50m.13s.
Shasta Dam iP =50m.16s.
Tinemaha ePZ =50m.16s.
Reno ePZ =50m.20s.k, eE =50m.44s., eN =51m.41s.
Vladivostok P =50m.23s., S =60m.52s.
Boulder City eP =50m.25s.
Pierce Ferry iP =50m.28s.
Tucson iP =50m.28s., ePP? =53m.44s., eS? =60m.52s., eL =77m.40s.
Overton iPZ =50m.29s.
Victoria eZ =50m.41s.
Logan eP =50m.51s.
Hungry Horse eP =51m.0s.
College eP =51m.3s., ipP =51m.25s., i =52m.20s., ePP =55m.4s., eSKS =61m.24s., eS? =62m.7s., eL =82m.1s.
Tacubaya e =51m.10s.
La Paz iPPZ =55m.44s., iSKS =62m.27s., eS =63m.20s., iSS =70m.10s., L =85m.
Tashkent ePKP =57m.8s., eSKS =64m.2s.?, eSKKS? =65m.41s.
Copenhagen eP =57m.46s., L =126m.
Stuttgart ePKPZ =57m.54s. and 58m.3s.
Collmberg eZ =57m.56s.
Helwan ePKPZ =57m.57s., eZ =58m.9s., 58m.19s., 58m.52s., and 61m.54s.
Ksara ePKP =57m.57s., iPP =61m.37s., SKS =64m.57s.
Jena ePKP?EN =57m.58s.?, eE =58m.7s., eN =58m.46s.
Tamanrasset ePKPZ =58m.13s., ePKP$_2$Z =59m.5s., iZ =60m.21s., ePPZ =63m.56s., eZ =67m.3s.
Huancayo eSKS =62m.6s., eS =62m.47s., eSS =68m.57s., eL =83m.18s.
Poona iE =63m.37s.
Bombay eEN =63m.42s.
Long waves were also recorded at Auckland, Bogota, Seven Falls, Paris, and Kew.

Feb. 8d. 21h. 14m. 15s. Epicentre 27°·5N. 95°·5E.

$A = -·0851$, $B = +·8842$, $C = +·4593$; $\delta = +1$; $h = +3$;
$D = +·995$, $E = +·096$; $G = -·044$, $H = +·457$, $K = -·888$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		7·4	267	e 1 52	0	i 3 15	− 3	2 23	P_g	3·0
Calcutta	E.	8·2	234	—	—	e 3 40	+ 2	—	—	—
New Delhi		16·2	278	e 3 44	− 6	6 57	+ 6	—	—	—
Nanking		20·7	71	e 5 1	PP	—	—	—	—	e 11·6
Kurmenty		20·9	323	e 4 41	− 5	—	—	—	—	—
Rybach'e		21·7	320	i 4 53	− 2	—	—	—	—	—
Almata		21·8	322	e 4 52	− 4	8 53	+ 1	—	—	—
Poona	E.	21·8	250	i 4 59	+ 3	e 8 50	− 2	9 24	SS	11·1
Bombay		22·5	252	e 5 10	+ 8	e 9 15	+10	—	—	—
Frunse		22·9	317	e 5 7	+ 1	e 9 17	+ 4	—	—	—
Andijan		23·2	310	e 5 8	− 1	e 9 17	− 1	—	—	—
Fergana		23·4	309	e 5 11	0	—	—	—	—	—
Kulyab		23·9	302	e 5 15	− 1	—	—	—	—	—
Obi-garm		24·3	304	i 5 18	− 2	e 9 32	− 5	—	—	—
Lunacharskoe		25·5	310	e 5 33	+ 1	—	—	—	—	—
Tashkent		25·5	310	e 5 31	− 1	e 9 58	+ 1	—	—	—
Irkutsk		25·6	11	e 5 35	+ 3	e 10 8	+ 9	—	—	—
Kabansk		25·9	15	5 36	+ 1	10 15?	+11	—	—	—
Samarkand		26·6	304	e 5 42	0	—	—	—	—	—
Ashkabad		32·8	298	e 6 40?	+ 3	—	—	—	—	—

Continued on next page.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Sverdlovsk		38·3	330	e 7 24	0	—	—	—	—	—
Tiflis		44·2	303	e 8 12	0	—	—	—	—	—
Borzhomi		45·0	303	e 8 19	0	—	—	—	—	—
Collmberg	z.	64·5	316	e 10 39	− 2	—	—	—	—	—
Stuttgart	z.	67·5	314	e 10 59	− 1	—	—	—	—	—
College		75·8	23	e 11 52	+ 2	—	—	—	—	—
Tamanrasset	z.	79·8	290	e 12 13	+ 1	—	—	e 15 1	PP	—
Hungry Horse		100·0	19	e 13 52	+ 4	—	—	—	—	—

Additional readings :—
Chatra PPN =1m.59s., PPPN =2m.4s., SSN =3m.20s., S*N =3m.39s.
Calcutta eE =4m.55s. and 5m.19s., S_gE =5m.56s.
New Delhi eEN =6m.26s., iSEN =6m.37s.
Poona PPE =5m.23s., PPPE =5m.34s., QE =9m.1s., SSSE =9m.36s., ScPE =12m.28s.

Feb. 8d. Readings also at 0h. (Tamanrasset, Palisades, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Hungry Horse, Boulder City, Overton, and Pierce Ferry), 1h. (Algiers Univ. (2)), 2h. (near Dzhergetal and near Andijan (2)), 3h. (Lick), 4h. (La Paz, Ili, Frunse, Lunacharskoe, Tashkent, near Fergana (2), Dzhergetal (2), Naryn, Tchimkent, Kulyab, Obi-garm (2), Samarkand, and Andijan (2)), 5h. (Ashkabad, College, and near Athens), 6h. (Bandong), 9h. (near Fergana and near College), 10h. (College), 11h. (Collmberg, Tamanrasset, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Lick, Hungry Horse, and College), 12h. (Collmberg, Tamanrasset, La Plata, Wellington, Palomar, Pasadena, China Lake, Tinemaha, Tucson, Hungry Horse, College, Boulder City, Overton (2), Pierce Ferry, Fresno, Lick, and Reno), 14h. (College), 15h. (Overton), 18h. (La Plata, San Juan, Pretoria, Mount Wilson, Riverside, China Lake, Tinemaha, Shasta Dam, Overton, Pierce Ferry, Hungry Horse, and Tamanrasset), 20h. (near Istanbul, near Chilisk, Kurmenty, and Ili), 21h. (Ksara).

Feb. 9d. 1h. 20m. 6s. Epicentre 22°·38, 179°·2W. Depth of focus 0·080.
(as on 1950, August 17d.).

A = −·9260, B = −·0129, C = −·3773 ; δ = 0 ; h = +4 ;
D = −·014, E = +1·000 ; G = +·377, H = +·005, K = −·926.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Apia		11·0	41	i 2 24	− 5	e 4 19	− 9	—	—	—
Auckland	N.	15·4	198	—	—	e 6 42	SSS	—	—	—
Tuai	N.	16·7	189	e 3 24	− 2	e 6 8	− 4	—	—	—
New Plymouth	E.	17·7	197	e 3 41	+ 5	—	—	—	—	—
Wellington		19·6	194	3 52	− 2	e 6 59	− 3	—	—	—
Cobb River	E.	19·9	199	e 3 58	+ 2	e 7 9	+ 3	—	—	—
Kaimata	N.E.	21·6	199	e 4 11	− 1	e 7 29	− 6	—	—	—
Christchurch		22·2	175	e 3 28	−50	e 7 54?	+10	—	—	—
Brisbane	z.	25·7	253	i 4 50a	+ 1	i 8 41	+ 1	i 5 14	pP	—
Riverview		28·5	239	i 5 15a	+ 2	i 9 26	+ 2	e 12 16	SSS	—
Berkeley	z.	80·3	43	i 11 16	0	—	—	—	—	—
Lick	z.	80·3	43	i 11 16k	0	—	—	i 13 19	pP	—
Pasadena		80·7	48	i 11 17k	− 1	—	—	—	—	—
Mount Wilson	z.	80·9	48	i 11 18k	− 1	—	—	e 13 16	pP	—
Fresno	z.	81·2	45	e 11 20k	0	—	—	—	—	—
Riverside	z.	81·2	48	i 11 20k	0	—	—	e 13 19	pP	—
Palomar		81·2	49	i 11 20k	0	—	—	e 13 20	pP	—
Shasta Dam		81·9	40	i 11 24	0	—	—	—	—	—
China Lake	z.	82·1	46	i 11 25k	0	—	—	e 13 24	pP	—
Mineral	N.	82·2	41	e 11 25	0	—	—	—	—	—
Tinemaha	z.	82·4	45	i 11 26k	0	—	—	—	—	—
Reno	z.	82·8	43	e 11 28k	0	—	—	—	—	—
Boulder City		84·0	48	i 11 35	+ 1	—	—	—	—	—
Overton	z.	84·6	47	i 11 38	+ 1	—	—	—	—	—
Pierce Ferry		84·7	48	i 11 38	0	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tucson		84·9	52	(i 11 40)	+ 1	—	—	(e 13 43)	pP	—
Victoria	z.	86·3	34	e 11 46	+ 1	—	—	—	—	—
Logan		89·1	44	e 11 58	− 1	—	—	—	—	—
College		89·8	13	i 12 1	− 1	—	—	e 14 4	pP	—
Hungry Horse		91·2	37	i 12 7	− 1	—	—	—	—	—
Copenhagen		145·5	349	i 18 38	[+ 1]	—	—	—	—	—
Ksara		147·1	297	i 18 44	[+ 5]	—	—	—	—	—
Collmberg	z.	149·5	345	e 18 43	[0]	—	—	e 21 0	pPKP	—
Jena		150·2	345	e 18 45	[+ 1]	—	—	e 20 59	pPKP	—
Prague		150·3	343	i 18 50	[+ 6]	e 25 26	[+27]	e 21 11	pPKP	—
Stuttgart	z.	152·8	348	e 18 47	[0]	—	—	—	—	—
Strasbourg		153·2	349	i 18 57	[+ 9]	—	—	—	—	—
Paris		153·5	357	i 18 58	[+10]	—	—	—	—	e 99·9
Besançon		154·8	351	e 19 18	PKP_2	—	—	—	—	—
Tamanrasset	z.	175·6	—	e 19 9	[+ 2]	e 30 47	SKKS	e 21 20	pPKP	—

Additional readings :—
Berkeley eZ =11m.20s.
Lick iZ =11m.21s.
Fresno eZ =11m.38s.
Shasta Dam i =11m.43s.
Reno eN =11m.54s., eE =12m.49s., eN =13m.50s., eE =14m.2s.
Overton iZ =11m.50s.
Tucson readings have been decreased by 5 minutes.
Logan e =12m.17s.
College i =12m.36s.
Ksara e =32m.27s.?
Collmberg iZ =18m.48s. and 18m.56s.
Jena eN =18m.50s., eE =19m.0s., eN =21m.28s.
Prague ePKP_2E =19m.15s., epPKP_2 =21m.24s., ePP =22m.34s., and other unidentified e readings.
Stuttgart iZ =18m.56s. and 19m.9s.
Strasbourg i =19m.11s.
Paris i =19m.13s.
Besançon e =19m.31s.
Tamanrasset ePKP_2Z =20m.52s., epPKP_2Z =22m.59s., ePPZ =24m.46s.

Feb. 9d. 4h. 34m. 43s. Epicentre 31°·5S. 71°·0W. Depth of focus 0·010.
(as on 1945, Feb. 12d.).

Intensity V between 31° and 32° south of Chile. Possibly a repetition of the shock on Feb. 8d., at 18h. Epicentre 31°·25S. 71°·5W. (Strasbourg).

F. Greve.
Boletín del año 1951, Instituto sismológico, Universidad de Chile, Santiago, p.5.

$A = +·2781$, $B = -·8077$, $C = -·5199$; $\delta = +1$; $h = +1$;
$D = -·945$, $E = -·326$; $G = -·169$, $H = +·492$, $K = -·854$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Plata	N.	11·4	111	2 23	−18	4 11	−36	—	—	5·0
La Paz		15·2	10	i 3 33k	+ 3	i 6 42	SS	—	—	8·3
Huancayo		19·8	349	e 4 29	+ 4	e 8 23	SS	e 4 53	pP	—
San Juan		49·8	7	e 7 51	−54	i 8 43	PP	e 8 11	pP	—
Tuscon		73·8	326	e 11 25	− 1	—	—	e 12 6	sP	—
Palomar	z.	77·7	323	i 11 48k	0	—	—	i 12 8	pP	—
Riverside	z.	78·4	323	i 11 51k	− 1	—	—	e 12 11	pP	—
Pierce Ferry		78·4	326	i 11 52	0	—	—	i 12 12	pP	—
Boulder City		78·7	326	i 11 53	0	—	—	—	—	—
Pasadena	z.	79·0	323	i 11 54k	− 1	—	—	i 12 15	pP	—
Overton	z.	79·0	326	i 11 55	0	—	—	i 12 15	pP	—
China Lake	z.	80·0	325	i 12 1k	+ 1	—	—	i 12 20	pP	—
Tinemaha	z.	81·3	324	i 12 6k	− 1	—	—	i 12 26	pP	—
Fresno	z.	81·8	324	e 12 18k	+ 8	—	—	—	—	—
Logan		82·0	332	e 12 11	0	—	—	e 12 55	sP	—
Lick	z.	83·2	323	i 12 18a	+ 1	—	—	i 12 38	pP	—
Reno	z.	83·9	325	e 12 21k	+ 1	—	—	e 12 41	pP	—
Shata Dam		86·1	324	i 12 32	+ 1	—	—	—	—	—
Hungry Horse		88·3	333	e 12 41	− 1	—	—	e 13 1	pP	—
Tamanrasset	z.	90·9	64	e 12 53	− 1	—	—	e 13 14	pP	—

Feb. 9d. Readings also at 0h. (Hungry Horse, Fergana, near Dzhergetai, Kulyab, and Obi-garm), 1h. (Krasnogorka, near Chilisk, Ili, Kurmenty, and near Dzhergetal), 2h. (Pierce Ferry, Kurmenty, near Chilisk, and Krasnogorka), 3h. (Mount Wilson, China Lake, Tinemaha, Overton (2), Pierce Ferry (2), Lick, Fresno, Hungry Horse, Victoria, and Rome), 4h. (near Algiers Univ.), 6h. (Hungry Horse), 7h. (Pierce Ferry (2), Overton (3), and near La Paz), 9h. (Huancayo, Andijan, Kulyab, near Khorog, Obi-garm, Dzhergetal, and near Alicante), 10h. (near Dzhergetal (2)), 12h. (Istanbul and near Ksara), 14h. (Kulyab, near Khorog, Obi-garm, and Fergana), 15h. (Kew and near Djakarta), 18h. (Apia and near Athens), 20h. (Tamanrasset, College (2), near Hungry Horse, and near Balboa Heights), 21h. (Tamanrasset, Hungry Horse, and College), 22h. (Pasadena, Riverside, Palomar, China Lake, Tinemaha, Reno, Berkeley, Mineral, Lick, Boulder City, Tucson, Pierce Ferry, Overton, College, and near Hungry Horse).

Feb. 10d. 3h. 27m. 55s. Epicentre 39°·9S. 176°·9E. (as on 1950, April 7d.).

Slight damage at Napier and Hastings. Felt widely throughout central and southern districts of North Island. Epicentre 40°·2S. 177°·0E. Maximum intensity Scale VI.

R. C. Hayes.
Earthquake origins in New Zealand in 1951. New Zealand Journal of Science and Technology, sec. B, Vol. 34, Mo. 4. Jan., 1953, p.253.

$A = -\cdot7682$, $B = +\cdot0416$, $C = -\cdot6389$; $\delta = +6$; $h = -2$;
$D = +\cdot054$, $E = +\cdot999$; $G = +\cdot638$, $H = -\cdot035$, $K = -\cdot769$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tuai	N.	1·1	10	i 0 25	+ 3	—	—	—	—	—
Wellington		2·1	230	e 0 34	− 3	—	—	—	—	—
New Plymouth	E.	2·3	290	e 0 42	+ 2	—	—	—	—	—
Cobb River	E.	3·4	248	e 0 51	− 4	—	—	—	—	—
Auckland	N.	3·5	331	i 0 57	0	—	—	—	—	—
Christchurch		4·8	220	e 1 17	+ 2	—	—	—	—	—
Kaimata	N.E.	4·8	236	e 1 12	− 3	—	—	—	—	—
Riverview		21·4	278	i 4 51a	0	e 8 52	+ 7	i 5 19	PP	e 10·5
Brisbane		23·3	295	i 5 11a	+ 1	i 9 45	+25	i 5 49	PP	—
Perth		49·2	260	—	—	i 20 58	Q	—	—	i 25·1
La Plata	N.	90·0	138	23 5	SKS	(23 5)	[−28]	24 41	PS	42·3
Vladivostok		92·1	329	e 13 11	− 1	e 23 51	[+ 6]	e 24 17	S	—
Pasadena		95·0	49	i 13 28	+ 2	e 23 59	[− 2]	i 24 51	S	e 39·1
Palomar	Z.	95·2	50	i 13 32	+ 5	—	—	—	—	—
Riverside	Z.	95·3	49	i 13 29	+ 2	—	—	—	—	—
Lick	Z.	95·3	44	e 13 29k	+ 2	—	—	e 17 21	PP	—
Berkeley		95·4	44	e 13 29	+ 1	e 24 50	+ 8	—	—	e 44·9
Huancayo		95·6	111	e 13 33	+ 5	e 24 12	[+ 8]	26 12	PS	e 38·8
Fresno	Z.	95·9	46	e 13 32k	+ 2	—	—	e 17 27	PP	—
China Lake	Z.	96·5	48	i 13 35	+ 3	—	—	—	—	—
Tinemaha	Z.	97·0	47	e 13 42	+ 7	—	—	—	—	—
La Paz	Z.	97·5	119	i 13 48	+11	—	—	i 17 49	PP	—
Mineral	Z.	97·6	42	e 13 39	+ 1	—	—	e 17 39	PP	—
Reno		97·9	44	e 13 50a	+11	—	—	e 17 45	PP	—
Tucson		98·1	54	e 18 2	PP	e 26 38	PS	e 30 37	SS	e 45·2
Boulder City		98·2	49	e 13 43	+ 3	e 15 35	?	—	—	—
Overton	Z.	98·8	49	e 14 47	+64	—	—	—	—	—
Pierce Ferry		98·8	50	i 14 46	+63	—	—	e 30 35	PKKP	—
Kodaikanal	E.	103·7	272	—	—	e 24 44	[− 1]	—	—	—
Logan		103·8	47	e 18 5	PKP	—	—	—	—	—
Bogota		107·5	98	e 10 0	PP	e 25 7	[+ 5]	e 28 12	PS	e 52·8
College		108·0	14	e 18 31	[+ 2]	—	—	—	—	—
Irkutsk		111·3	321	e 19 25?	PP	—	—	—	—	—
Bombay		112·5	277	—	—	e 25 35	[+13]	—	—	—
Cleveland		122·5	61	i 18 58k	[0]	e 37 54	SS	—	—	—
Frunse		123·6	301	e 18 58	[− 2]	—	—	—	—	—
Washington	Z.	124·4	65	e 19 10	[+ 9]	—	—	e 20 58	PP	—
Kulyab		124·7	293	19 4	[+ 2]	e 30 38?	PS	—	—	—
Tashkent		126·6	297	i 19 3	[− 2]	30 51	PS	e 20 56	PP	—
Tchimkent		126·7	298	e 19 3	[− 3]	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Palisades		127·5	64	e 19 7	[0]	—	—	—	—	—
Resolute Bay		127·6	19	19 6	[− 1]	e 22 23	PKS	e 21 11	PP	36·5
Ottawa		128·0	58	e 19 8k	[0]	e 25 38	[−37]	e 38 35	SS	e 57·1
Mary		130·3	289	i 19 13	[0]	e 22 47	PKS	e 21 23	PP	—
Seven Falls	E.	131·8	57	i 22 52	PKS	e 39 54	SSP	—	—	65·3
Sverdlovsk		136·1	315	i 19 21	[− 2]	e 32 7	PS	21 45	PP	—
Baku		140·8	289	e 19 17	[−15]	—	—	e 22 29	PP	—
Tiflis		144·1	289	e 19 34	[− 4]	i 22 53	PKS	42 23	SS	—
Borzhomi		145·1	289	19 41	[+ 2]	—	—	—	—	—
Scoresby Sund		147·8	12	i 19 46	[+ 2]	—	—	—	—	—
Ksara		148·4	272	i 19 47	[+ 2]	—	—	i 23 17	PP	—
Helwan	Z.	150·2	262	19 47	[− 1]	—	—	e 23 23	PP	—
Tamanrasset	Z.	161·5	206	e 20 3k	[+ 1]	e 23 11	PKS	e 24 19	PP	—
Collmberg	Z.	164·0	321	e 20 4	[− 1]	—	—	e 20 56	PKP_2	—
Taranto		164·4	279	e 25 27	PP	—	—	—	—	e 68·3
Jena	N.	164·9	321	e 20 5	[− 1]	—	—	e 21 0	PKP_2	—
Triest	Z.	166·4	302	i 20 6	[− 1]	—	—	i 24 56	PP	—
Rathfarnham Castle		166·4	9	—	—	e 47 13	SSP	—	—	e 86·1
Stuttgart	Z.	167·5	319	e 20 4	[− 4]	—	—	—	—	—
Kew		168·3	351	—	—	e 42 29	?	—	—	e 87·1
Besançon		170·2	321	e 20 8	[− 1]	—	—	—	—	—
Algiers Univ.	Z.	176·9	—	e 20 12	[0]	e 25 33	PP	e 21 42	PKP_2	—

Additional readings and note :—
Riverview iE = 4m.56s., 5m.13s., and 9m.9s.
La Plata N = 29m.29s., SN = 32m.59s., phases wrongly identified.
Vladivostok eSS = 30m.23s.
Pasadena iZ = 13m.35s., iPPZ = 17m.43s., eN = 25m.5s., eSSN = 31m.5s.
Palomar iZ = 13m.43s.
Lick eZ = 13m.37s.
Berkeley eZ = 13m.36s.
Huancayo i = 13m.40s., eSS = 31m.15s.
Fresno eZ = 13m.37s.
Overton eZ = 16m.36s.
Bogota eSSEN = 34m.18s., eSSSEN = 38m.21s.
Cleveland ePZ = 19m.4s.
Tiflis SSS = 45m.29s.
Helwan eZ = 22m.33s. and 24m.43s.
Jena eE = 20m.57s.
Long waves were also recorded at Weston, Copenhagen, De Bilt, Paris, Strasbourg, Granada and Galerazamba.

Feb. 10d. 8h. 38m. 14s. Epicentre 43°·9N. 146°·2E. Depth of focus 0·010.
(as on 1950, Jan. 4d.).

Intensity V-VI at Nishebetsu (Hokkaido) ; V at Nemuro, Shibecha, Onnebira, Shiranuka, Ochiishi, Attoko ; IV at Kusiro, Chanai, Akkeshi, Teshikaga, Tsurui, Akubetsu, Misono, Shibetsu, Nakashibetsu, Noshappu ; II-III at Mito, Koshimizu, Kawayu, and Nuibetsu. Epicentre 43°·5N. 146°·4E. Depth of focus 60km.

Seismo. Bull. Cent. Obs., Japan, 1951. Tokyo, 1951, p.39, with chart.

$A = -·6007$, $B = +·4021$, $C = +·6909$; $\delta = -13$; $h = -3$;
$D = +·556$, $E = +·831$; $G = -·574$, $H = +·384$, $K = -·723$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro	0·7	218	0 15k	− 3	0 24	− 7	—	—	—
Abashiri	1·4	275	0 27k	+ 2	0 46	+ 2	—	—	—
Kusiro	1·6	235	0 24	− 4	0 42	− 7	—	—	—
Urakawa	3·0	235	0 45	− 2	1 18	− 4	—	—	—
Sapporo	3·6	260	0 56a	+ 1	1 35	− 2	—	—	—
Wakkanai	3·6	297	1 0	+ 5	1 45	+ 8	—	—	—
Yuzno-Sakhlinsk	3·9	323	1 4	+ 5	1 47	+ 3	—	—	—
Muroran	4·1	250	1 4	+ 2	1 52	+ 3	—	—	—
Hatinohe	4·8	228	1 9	− 2	1 56	−10	—	—	—
Aomori	5·1	235	1 19	+ 3	2 5	− 9	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Miyako		5·3	219	1 14?	− 4	2 1?	−17	—	—	—
Morioka		5·6	224	1 15	− 7	2 10	−16	—	—	—
Mizusawa		6·1	221	1 33	+ 4	2 22	−16	—	—	—
Akita		6·2	230	2 33	+63	—	—	—	—	—
Sendai		6·9	218	1 37	− 3	—	—	—	—	—
Hukusima		7·5	218	1 46	− 2	2 53	−19	—	—	—
Inawashiro		7·8	218	1 53	+ 1	3 20	0	—	—	—
Onahama		8·0	212	2 18	+23	—	—	—	—	—
Shirakawa		8·2	216	2 5	+ 7	3 13	−17	—	—	—
Mito		8·7	213	2 3	− 2	3 25	−17	—	—	—
Utunomiya		8·8	216	2 0	− 6	3 36	− 8	—	—	—
Tukubasan		9·0	214	2 9	0	3 31	−18	—	—	—
Kumagaya		9·3	217	2 9	− 4	4 15	+19	—	—	—
Maebasi		9·3	219	2 26?	+13	3 47?	− 9	—	—	—
Nagano		9·5	223	2 19	+ 3	4 9	+ 8	—	—	—
Oiwake		9·6	220	3 0	+43	—	—	—	—	—
Tokyo		9·6	214	2 6	−11	3 48	−16	—	—	—
Matumoto		9·9	222	2 14	− 7	4 1	−10	—	—	—
Kohu		10·1	218	2 49	+25	4 6	−10	—	—	—
Hunatu		10·2	217	2 38	+13	4 2	−16	—	—	—
Misima		10·4	215	2 36	+ 8	4 6	−17	—	—	—
Vladivostok		10·5	271	i 2 26	− 3	i 4 20	− 5	—	—	—
Nagoya		11·2	222	2 56	+18	—	—	—	—	—
Klyuchi		15·5	32	3 43	+ 9	6 46	+23	—	—	—
Nanking		24·5	251	5 10a	− 1	e 9 28	+ 6	i 5 30	pP	—
Irkutsk		28·9	303	e 5 46?	− 6	—	—	—	—	—
College		41·4	36	i 7 40	+ 2	i 13 48	+ 2	i 8 7	pP	e 22·2
Chilisk		47·7	295	i 8 28	− 1	—	—	—	—	—
Ili		48·4	296	i 8 33	− 1	—	—	—	—	—
Almata		48·8	295	i 8 39	+ 2	—	—	—	—	—
Krasnogorka		50·0	296	i 8 45	− 1	—	—	—	—	—
Naryn		50·2	293	i 8 47	− 1	—	—	—	—	—
Frunse		50·5	295	8 52	+ 2	i 16 0	+ 5	—	—	—
Sverdlovsk		52·6	317	9 6	0	16 26	+ 2	—	—	—
Andijan		53·0	294	9 9	0	16 32	+ 3	—	—	—
Fergana		53·5	294	i 9 12	− 1	—	—	—	—	—
Tchimkent		54·0	297	i 9 22	+ 6	—	—	—	—	—
Lunacharskoe		54·7	297	e 9 21	0	—	—	—	—	—
Tashkent		54·7	297	i 9 19	− 2	e 16 55?	+ 3	—	—	—
Resolute Bay		55·0	17	9 23	− 1	16 59	+ 3	18 46	ScS	—
Obi-garm		55·8	293	e 9 25	− 4	17 5	− 2	—	—	—
Kulyab		56·2	292	e 9 35	+ 3	—	—	—	—	—
Samarkand		57·1	296	e 9 38	− 1	—	—	—	—	—
Victoria	z.	59·1	51	e 9 54	+ 2	—	—	—	—	—
Mary		61·5	297	i 10 10	+ 1	—	—	—	—	—
Ashkabad		63·6	298	i 10 23	0	—	—	—	—	—
Moscow		63·9	324	e 10 25	0	—	—	—	—	—
Pulkovo		64·1	330	i 10 26	0	—	—	—	—	—
Shasta Dam		64·2	57	i 10 27	0	—	—	—	—	—
Hungry Horse		64·4	47	i 10 29	+ 1	—	—	—	—	—
Mineral	z.	64·9	57	i 10 31k	0	—	—	i 10 44	pP	—
Scoresby Sund		65·6	357	i 10 37k	+ 1	—	—	—	—	—
Berkeley	z.	66·0	60	i 10 39	+ 1	—	—	e 11 10	pP	—
Reno		66·5	57	e 10 42k	+ 1	—	—	—	—	—
Lick	z.	66·7	60	i 10 43k	0	—	—	i 11 13	pP	—
Grozny		67·9	310	10 51	+ 1	—	—	—	—	—
Shemakla		67·9	306	e 10 49	− 1	—	—	—	—	—
Fresno	z.	68·2	59	e 10 52k	0	—	—	e 11 14	pP	—
Tinemaha	z.	69·0	58	i 10 59k	+ 2	—	—	i 11 26	pP	—
Kirovobad		69·2	306	10 59	+ 1	—	—	—	—	—
Tiflis		69·4	309	11 1	+ 1	—	—	—	—	—
Borzhomi		70·2	310	11 6	+ 2	—	—	—	—	—
China Lake	z.	70·2	59	i 11 5k	+ 1	—	—	i 11 34	pP	—
Pasadena		70·9	60	i 11 9k	+ 1	—	—	e 11 35	pP	—
Sotchi		71·0	313	e 11 6	− 3	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	z.	71·3	174	i 11 9k	− 2	—	—	—	—	—
Riverside	z.	71·5	60	i 11 11k	− 1	—	—	—	—	—
Overton	z.	71·7	57	i 11 23	+10	—	—	—	—	—
Boulder City		71·8	57	i 11 15	+ 1	—	—	i 11 47	pP	—
Palomar	z.	72·2	60	i 11 17k	+ 1	—	—	e 11 46	pP	—
Pierce Ferry		72·2	57	i 11 18	+ 2	—	—	—	—	—
Yalta		73·2	316	e 11 23	+ 1	—	—	—	—	—
Uzhgorod		75·5	325	e 11 37	+ 2	—	—	—	—	—
Tucson		76·7	58	i 11 43	+ 1	—	—	e 12 10	pP	—
Collmberg	z.	76·9	332	e 11 44	+ 1	—	—	—	—	e 42·3
Jena		77·7	332	e 11 48	0	e 12 28	sP	e 12 14	pP	—
Belgrade	z.	79·4	324	e 11 58	+ 1	—	—	e 12 22	pP	—
Stuttgart	z.	80·3	333	i 12 2a	0	—	—	e 12 26	pP	—
Kew	z.	80·7	340	i 12 6	+ 2	—	—	—	—	—
Strasbourg		80·9	334	i 12 6a	+ 1	—	—	—	—	—
Besançon		82·7	334	i 12 14	0	—	—	e 12 29	pP	—
St. Louis		83·3	41	e 12 18	+ 1	e 22 32	+ 4	e 12 44	pP	—
Ottawa	z.	83·6	28	e 12 18	− 1	—	—	—	—	—
Morgantown		87·0	34	i 12 37	+ 1	—	—	—	—	—
Harvard		87·6	27	i 12 40	+ 2	—	—	—	—	—
Weston		87·8	27	e 12 41	+ 2	—	—	i 13 7	pP	—
Algiers Univ.	z.	93·0	331	e 13 5	+ 1	—	—	—	—	—
Tamanrasset	z.	104·5	322	e 13 56	+ 1	—	—	i 18 7	PP	—
La Paz	z.	140·1	57	i 23 16	PP	—	—	—	—	—

Additional readings :—
Nanking iZ = 6m.0s.
College eSS = 17m.7s.
Berkeley eZ = 10m.48s.
Brisbane iZ = 11m.16s.
Besançon e = 12m.38s.
Tamanrasset eZ = 17m.18s.

Feb. 10d. 10h. 49m. 55s. Epicentre 15°·5N. 96°·7W. (as on 1950, Sept. 8d.).

$A = -·1125$, $B = -·9575$, $C = +·2656$; $\delta = +1$; $h = +6$;
$D = -·993$, $E = +·117$; $G = -·030$, $H = -·264$, $K = -·964$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca		1·5	358	0 25	− 3	—	—	—	—	0·6
Vera Cruz		3·7	8	1 0	0	1 38	− 7	—	—	—
Puebla		3·8	337	1 2	+ 1	1 41	− 6	—	—	1·8
Tacubaya		4·5	329	1 12	+ 1	2 5	0	—	—	—
Merida		8·6	50	e 2 12	+ 3	i 3 31	−17	—	—	—
Tucson		21·1	326	i 4 47	− 1	e 9 48	+69	i 5 8	pP	e 11·2
Palomar	z.	25·5	319	i 5 33	+ 1	—	—	i 5 50	pP	—
Pierce Ferry		25·7	327	i 5 33	0	—	—	—	—	—
Boulder City		26·0	326	i 5 36	0	e 13 49	L	—	—	(e 13·8)
Overton	z.	26·2	327	i 5 38	0	—	—	—	—	e 14·1
Riverside	z.	26·2	319	i 5 39	+ 1	—	—	—	—	—
Mount Wilson	z.	26·8	319	e 5 45	+ 1	—	—	i 5 58	pP	—
China Lake	z.	27·5	322	e 5 50	0	—	—	—	—	—
Tinemaha	z.	28·8	323	e 6 1	− 1	—	—	—	—	—
Lick		31·0	320	e 6 26k	+ 5	—	—	—	—	—
Reno		31·3	325	e 6 13a	−11	—	—	—	—	—
Mineral		32·9	324	e 6 53a	+15	—	—	—	—	—
Ottawa	z.	34·6	26	i 6 48	− 5	—	—	—	—	—
Hungry Horse		35·7	341	i 6 59	− 3	—	—	—	—	—
College		60·1	338	i 10 8	− 3	—	—	—	—	—

Additional readings :—
Tucson ePP = 6m.12s.
Riverside eZ = 5m.58s.
Lick eZ = 6m.35s.
Reno eZ = 6m.57s.
College i = 10m.28s. and 10m.37s.
Long waves were also recorded at Guadalajara.

Feb. 10d. 11h. 16m. 45s. Epicentre 12°·8N. 145°·5E. Depth of focus 0·005.
(as on 1943, April 26d.).

$A = -·8039$, $B = +·5525$, $C = +·2201$; $\delta = -4$; $h = +6$;
$D = +·566$, $E = +·824$; $G = -·181$, $H = +·125$, $K = -·975$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guam		1·0	312	0 24	+ 5	—	—	—	—	—
Vladivostok		32·4	342	e 7 45	PPP	e 11 25	− 9	—	—	—
Klyuchi		45·0	13	e 8 12	+ 1	—	—	e 9 37	PP	—
Irkutsk		51·3	329	e 8 53	− 7	e 16 6	− 6	—	—	—
Almata		65·7	313	i 10 40	0	—	—	—	—	—
Ili		65·7	314	e 10 37	− 3	—	—	—	—	—
Krasnogorka		67·0	313	e 10 47	− 1	—	—	—	—	—
Frunse		67·4	312	e 10 47	− 4	—	—	—	—	—
College		68·7	25	e 10 53	− 6	—	—	—	—	e 29·0
Andijan		69·0	309	11 1	0	20 0	+ 1	—	—	—
Fergana		69·5	309	e 11 2	− 2	—	—	—	—	—
Kulyab		71·0	306	11 12	− 1	20 23	+ 1	—	—	—
Obi-garm		71·1	307	e 11 22	+ 9	—	—	—	—	—
Tchimkent		71·1	311	i 11 11	− 2	—	—	—	—	—
Tashkent		71·3	309	i 11 13	− 2	e 21 4	ScS	—	—	—
Sverdlovsk		76·6	325	i 11 44	− 1	21 19	− 6	—	—	—
Victoria	z.	81·3	42	e 12 20	+ 9	—	—	—	—	—
Shasta Dam		83·4	50	e 12 21	− 1	—	—	—	—	—
Berkeley	z.	84·0	53	e 12 25	0	—	—	i 12 37	pP	—
Mineral	z.	84·0	50	e 12 24a	− 1	—	—	i 12 36	pP	—
Lick	z.	84·6	53	i 12 27k	− 1	—	—	i 12 37	pP	—
Resolute Bay		85·2	13	12 27	− 4	—	—	e 12 42	pP	—
Reno	z.	85·5	50	e 12 33k	+ 1	—	—	e 13 1	SP	—
Fresno	z.	86·2	53	e 12 35a	0	—	—	—	—	—
Tinemaha	z.	87·3	53	e 12 41	0	—	—	i 12 59	sP	—
Hungry Horse		87·4	41	i 12 40	− 1	—	—	e 16 0	PP	—
China Lake	z.	88·1	53	i 12 46	+ 1	i 13 13	sP	e 12 56	pP	—
Pasadena		88·1	55	i 12 44	− 1	i 13 2	sP	i 12 54	pP	e 39·2
Riverside	z.	88·7	55	i 12 47	0	i 13 5	sP	i 12 57	pP	—
Palomar	z.	89·3	56	i 12 50	0	i 13 7	sP	i 13 1	pP	—
Boulder City		90·2	53	i 12 56	+ 1	e 23 43	+ 2	—	—	—
Overton	z.	90·4	52	i 12 57	+ 2	—	—	—	—	—
Pierce Ferry		90·8	52	i 12 59	+ 2	—	—	i 13 17	pP	—
Tucson		94·5	56	e 13 17	+ 3	—	—	e 13 34	pP	—
Collmberg	z.	104·0	331	e 17 44?	PP	—	—	—	—	—
Stuttgart	z.	107·6	331	e 18 36	PP	—	—	e 18 49	PP	—
Tamanrasset	z.	127·2	312	e 19 2	[+ 5]	e 21 16	PP	e 19 19	pPKP	—

Additional readings :—
College i = 11m.26s.
Lick iZ = 12m.45s.
Resolute Bay eN = 17m.39s., e = 18m.21s.
Reno eZ = 13m.15s.
Long waves were also recorded at Paris and Huancayo.

Feb. 10d. 15h. 12m. 18s. Epicentre 19°·6N. 69°·4W. (as on 1949, Feb. 5d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		3·3	111	i 0 55	+ 2	i 1 39	+4	i 1 3	P•	i 1·9
Bogota		15·6	198	e 3 42	− 1	e 5 42	−55	e 3 56	PP	—
Washington	z.	20·4	344	e 4 45	+ 4	—	—	—	—	—
Morgantown		21·9	338	e 4 55	− 2	—	—	—	—	—
Weston		22·8	357	e 5 13	+ 8	e 9 12	+ 1	—	—	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Harvard		22·9	357	i 5 10	+ 4	e 9 8	− 5	—	—	—
Pierce Ferry		42·3	304	i 7 54	− 3	—	—	—	—	—
Overton	z.	42·8	304	i 8 4	+ 3	—	—	—	—	—
Boulder City		43·0	303	e 7 53	−10	—	—	—	—	—
Palomar	z.	44·3	299	e 8 19	+ 6	—	—	—	—	—
Riverside	z.	44·8	300	e 8 20	+ 3	—	—	—	—	—
China Lake	z.	45·2	302	e 8 16	− 4	—	—	—	—	—
Mount Wilson	z.	45·4	300	e 8 17	− 5	—	—	—	—	—
Hungry Horse		45·9	320	e 8 21	− 5	—	—	—	—	—
Tinemaha	z.	45·9	304	e 8 22	− 4	—	—	—	—	—
College		67·5	334	e 10 59	− 1	—	—	—	—	—
Tamanrasset	z.	69·2	72	e 11 10	0	—	—	—	—	—

Hungry Horse gives also iP = 8m.27s.

Feb. 10d. 15h. 17m. 0s. Epicentre 6°·0S. 110°·0E. Depth of focus 0·090.
(as on 1948, Sept. 27d.).

A = −·3402, B = +·9346, C = −·1038; δ = −1; h = +7;
D = +·940, E = +·342; G = +·035, H = −·098, K = −·995.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	35·4	324	e 6 4	− 4	i 11 5	+ 2	9 8	PcP	13·9
Kodaikanal	E.	36·2	296	i 6 16	+ 1	i 11 19	+ 4	—	—	—
Nanking		38·7	11	6 35	0	11 51	0	i 8 13	PP	—
Hyderabad	N.	38·9	307	6 33	− 4	11 53	− 1	—	—	—
Chatra	Z.	39·4	328	i 6 40	− 1	—	—	i 8 37	PP	—
Poona		43·2	306	i 7 12	+ 1	i 12 53	− 3	—	—	—
Bombay		44·2	305	e 7 20	+ 2	e 11 42	?	—	—	—
Brisbane	Z.	46·1	123	i 7 33	0	—	—	—	—	—
New Delhi		46·7	319	i 7 37	− 1	i 13 42	− 2	16 26	SS	—
Riverview		47·1	132	i 6 0a	?	i 13 58	+ 8	e 17 37	SS	e 24·3
Vladivostok		52·8	21	—	—	15 3	− 3	—	—	—
Naryn		56·5	330	i 8 48	0	15 55	+ 1	—	—	—
Kurmenty		56·7	334	i 8 49	0	—	—	—	—	—
Rybach'e		57·2	332	i 8 52	− 1	i 16 5	+ 2	—	—	—
Almata II		57·3	332	i 8 52	− 1	—	—	—	—	—
Almata		57·5	332	i 8 54	− 1	16 9	+ 2	19 26	sS	—
Kulyab		57·5	323	e 8 53	− 2	—	—	—	—	—
Andijan		57·9	327	8 58	0	16 14	+ 2	19 27	sS	—
Ili		57·9	333	i 8 56	− 2	—	—	—	—	—
Fergana		58·0	327	8 58	0	—	—	—	—	—
Obi-garm		58·1	324	i 8 56	− 3	e 16 11	− 4	—	—	—
Frunse		58·3	330	i 9 0	0	i 16 20	+ 3	e 19 39	sS	—
Irkutsk		58·3	356	8 59	− 1	16 17	0	e 19 33	sS	—
Krasnogorka		58·3	331	e 9 0	0	—	—	—	—	—
Lunacharskoe		60·0	325	e 9 13	+ 2	—	—	—	—	—
Tashkent		60·0	325	e 9 10	− 1	i 16 37	− 2	—	—	—
Samarkand		60·3	322	e 9 12	− 1	—	—	—	—	—
Tchimkent		60·5	327	i 9 14	− 1	—	—	—	—	—
Mary		62·3	318	i 9 27	+ 1	17 10	+ 3	e 11 19	pP	—
Baku		71·8	316	e 10 28	+ 4	—	—	—	—	—
Kirovobad		74·4	315	10 40	+ 1	—	—	—	—	—
Sverdlovsk		74·4	335	i 10 40	+ 1	19 26	0	i 12 35	pP	—
Grozny		75·9	318	e 10 51	+ 4	e 19 44	+ 2	—	—	—
Tiflis		75·9	316	10 49?	+ 2	e 19 43?	+ 1	—	—	—
Leninakan		76·2	315	e 10 54	+ 5	—	—	—	—	—
Borzhomi		76·9	315	10 54	+ 2	19 57	+ 5	—	—	—
Abastumanj		77·3	315	e 10 55	0	—	—	—	—	—
Pietermaritzburg z.		78·0	241	i 11 4	+ 6	—	—	—	—	—
Sotchi		80·1	316	e 11 13	+ 4	—	—	—	—	—
Ksara		80·3	306	i 11 14	+ 4	21 28	SP	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Moscow		85·1	327	e 11 36	+ 2	21 15	+ 1	24 52	sS	—
Pulkovo		90·0	330	e 12 0	+ 3	e 22 3	+ 5	—	—	—
Colimberg	z.	99·0	321	e 16 50	PP	—	—	—	—	—
College		100·6	25	e 12 52	+ 7	e 17 6	PP	e 29 1	PKKP	—
Stuttgart	z.	101·6	319	e 17 7	PKP	—	—	—	—	—
Tamanrasset	z.	105·6	293	e 16 45	?	—	—	e 17 34	PP	—
Mineral	z.	122·6	45	i 17 52k	[+ 4]	—	—	—	—	—
Hungry Horse		123·7	34	i 17 53	[+ 3]	—	—	—	—	—
Lick	z.	123·7	48	i 17 54k	[+ 4]	—	—	—	—	—
Reno		124·2	45	e 17 55k	[+ 4]	—	—	—	—	—
Fresno	z.	125·3	48	e 17 58k	[+ 5]	—	—	—	—	—
Tinemaha	z.	126·3	48	i 18 1	[+ 6]	—	—	—	—	—
China Lake	z.	127·3	49	e 18 1	[+ 4]	—	—	i 20 28	PP	—
Pasadena	z.	127·4	51	i 18 2	[+ 5]	—	—	e 20 23	PP	—
Riverside	z.	128·1	51	i 18 3	[+ 4]	—	—	—	—	—
Palomar	z.	128·8	51	i 18 2	[+ 2]	—	—	i 20 32	PP	—
Overton	z.	129·3	47	i 18 6	[+ 5]	e 31 14	SKKP	i 20 36	pPKP	—
Boulder City		129·7	47	i 18 7	[+ 5]	—	—	i 20 35	pPKP	—
Pierce Ferry		129·8	47	e 18 7	[+ 5]	—	—	i 20 37	pPKP	—
Tucson		133·8	50	e 18 10	[+ 1]	i 21 52	PKS	e 20 52	pPKP	—
Ottawa	z.	140·4	6	e 18 17	[− 4]	—	—	—	—	—
Harvard		143·6	2	i 18 28	[0]	—	—	—	—	—
Weston		143·7	2	i 18 28	[0]	—	—	—	—	—
Palisades		145·0	4	i 18 32	[+ 2]	—	—	—	—	—
Washington	z.	146·6	9	i 18 38	[+ 6]	—	—	e 20 45	pPKP	—
Tacubaya		148·6	62	e 18 48	[+13]	—	—	—	—	—
San Juan		167·1	344	i 19 2	[+ 5]	—	—	—	—	—
Bogota		175·7	—	—	—	e 30 33	SKKS	—	—	—

Additional readings :—
Calcutta QE =12m.25s., SSSE =13m.3s.
New Delhi SSSN =16m.54s.
Riverview iZ =9m.25s.
Sverdlovsk sS =22m.52s.
Pietermaritzburg iZ =11m.18s.
Tamanrasset eZ =17m.46s.
Mineral iZ =17m.56s.
Lick iZ =18m.2s. and 18m.27s.
China Lake eZ =20m.11s.
Palomar iZ =18m.26s., eZ =20m.12s.
Tucson e =18m.16s.

Feb. 10d. 21h. 52m. 13s. Epicentre 2°·1S. 138°·5E. (as on 1950, Sept. 19d.).

$A = -·7485$, $B = +·6622$, $C = -·0364$; $\delta = +9$; $h = +7$;
$D = +·663$, $E = +·749$; $G = +·027$, $H = -·024$, $K = -·999$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		24·0	314	e 5 16	− 1	—	—	—	—	—
Brisbane		28·8	152	i 6 6	+ 4	i 11 19	+28	—	—	—
Riverview		33·7	160	i 6 52a	+ 7	i 12 32	+24	—	—	e 16·8
Nanking		38·8	332	7 29	+ 1	e 13 16	−10	—	—	—
Vladivostok		45·4	353	—	—	i 14 58	− 6	i 18 23	SS	—
Wellington		50·9	144	—	—	e 22 47?	?	—	—	e 29·8
Christchurch	z.	51·2	148	e 9 42	+35	—	—	—	—	—
Calcutta	E.	54·7	299	e 8 51	−42	e 17 14	+ 1	—	—	—
Irkutsk		61·4	337	e 10 19	− 1	18 38	− 2	—	—	—
New Delhi		66·1	303	e 10 50	− 1	e 19 38	− 1	—	—	—
Poona		66·8	291	i 10 55	− 1	i 19 45	− 3	11 18	PcP	—
Bombay		67·8	291	e 11 0	− 2	e 20 1	+ 1	—	—	—
Kurmenty		70·2	317	e 11 17	0	—	—	—	—	—
Almata		71·2	317	i 11 22	− 1	e 20 39	− 1	—	—	—
Naryn		71·2	314	i 11 22	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ili		71·3	318	11 22	− 1	—	—	—	—	—
Krasnogorka		72·4	318	e 11 29	− 1	—	—	—	—	—
Frunse		72·6	316	i 11 31	0	e 20 56	0	—	—	—
Andijan		73·5	313	e 11 37	+ 1	i 21 7	+ 1	—	—	—
Fergana		73·8	313	e 11 38	0	e 21 7	− 2	—	—	—
Kulyab		74·7	310	i 11 43	0	—	—	—	—	—
Obi-garm		74·9	311	e 11 45	+ 1	e 21 22	0	—	—	—
Stalinabad		75·6	311	i 11 48	0	i 21 28	− 1	—	—	—
Lunacharskoe		75·9	313	11 51	+ 1	e 21 30	− 2	—	—	—
Tashkent		75·9	313	i 11 50	0	i 21 30	− 2	—	—	—
Tchimkent		76·0	314	i 11 51	0	—	—	—	—	—
Mary		80·7	308	i 12 19	+ 3	—	—	12 26	PcP	—
Ashkabad		83·5	308	i 12 34	+ 3	i 22 52	0	—	—	—
College		85·0	24	e 12 37	− 1	e 23 8	+ 1	e 28 46	SS	e 39·2
Sverdlovsk		85·1	327	i 12 39	0	23 4	− 4	—	—	—
Sitka		89·7	33	—	—	e 23 27	[− 4]	—	—	e 44·3
Baku		90·3	310	—	—	e 24 4	+ 7	—	—	—
Lenkoran		91·1	309	—	—	i 24 7	+ 3	—	—	—
Mineral	z.	98·9	49	e 13 51a	+ 8	—	—	—	—	—
Lick	z.	99·1	52	e 13 49k	+ 5	—	—	—	—	—
Resolute Bay		101·2	12	13 52	− 2	24 29	[− 4]	25 4	SKKS	—
Ksara		101·6	303	e 18 14	PP	e 26 52	PS	—	—	—
China Lake	z.	102·5	53	e 14 14	+14	—	—	—	—	—
Riverside	z.	102·9	55	e 14 14	+13	—	—	e 18 14	PKP	—
Hungry Horse		103·1	40	e 14 5	+ 3	—	—	e 30 1	PKKP	—
Overton	z.	104·9	52	e 18 39	PP	—	—	—	—	—
Pierce Ferry		105·3	53	i 14 17	+ 5	—	—	e 18 17	PKP	—
Helwan	z.	105·9	300	e 16 8	?	—	—	e 19 7	PP	—
Tucson		108·6	56	18 7	[−23]	—	—	e 19 11	PP	e 49·1
Collmberg	z.	113·1	326	e 18 43	[+ 4]	—	—	e 19 29	PP	—
Stuttgart		116·5	325	e 18 52?	[+ 6]	—	—	e 19 56	PP	e 60·8
Cleveland	z.	126·8	37	i 19 7k	[+ 1]	—	—	i 19 18	PKP_2	—
Ottawa		127·1	29	e 19 3	[− 3]	e 28 3	{+ 2}	—	—	e 51·9
Seven Falls	E.	128·4	25	—	—	e 32 57	PPS	—	—	56·9
Tamanrasset	z.	130·0	298	e 19 16	[+ 4]	e 22 37	PKS	e 21 24	PP	—
Palisades		131·5	32	—	—	e 38 25	SS	—	—	—
Huancayo		143·6	114	e 19 40	[+ 3]	—	—	—	—	—
La Paz		147·9	126	e 19 53	[+ 9]	42 47	SS	i 20 25	pPKP	—
San Juan		150·9	54	e 19 57	[+ 8]	—	—	—	—	—

Additional readings and note :—
Manila reading given at 23h.
Brisbane iZ = 6m.9s.
Poona PPE = 13m.26s., PPPE = 14m.56s., ScPE = 15m.18s., PSE = 20m.10s., PPSE = 20m.21s., ScSE = 20m.31s.
College iP = 12m.41s.
Resolute Bay PPS = 27m.58s., SS = 32m.35s.
Tamanrasset ePPPZ = 24m.17s.
La Paz iPKP = 19m.56s., i = 34m.59s.
San Juan i = 20m.7s.
Long waves were also recorded at Berkeley, Tacubaya, and other European stations.

Feb. 10d. Readings also at 0h. (Overton, Pierce Ferry, Hungry Horse (2), and College), 1h. (Basle and near Huancayo), 3h. (near Tucson), 4h. (Dzhergetal, Ili, near Chilisk, and Kurmenty), 7h. (College (2)), 9h. (College (2), and Mineral), 10h. (near Obi-garm), 11h. (Pierce Ferry), 12h. (College), 13h. (Apia), 14h. (Apia, Brisbane, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton (2), Pierce Ferry, Shasta Dam, Lick (2), Mineral (2), San Juan, Hungry Horse, College, Algiers Univ., Tamanrasset, La Plata, and Pretoria), 15h. (Collmberg, Stuttgart, Harvard, and Brisbane), 17h. (Christchurch, Cobb River, Kaimata, Wellington, Puebla, Tacubaya, Vera Cruz, Mary, near Ashkabad, near Overton, Pierce Ferry, and near Apia (2)), 19h. (near Istanbul), 21h. (Apia, Chatra, Almata, Almata II, Ili, Kulyab, Lunacharskoe, Obi-garm, Tchimkent, near Andijan, Dzhergetal, Fergana, Frunse, Krasnogorka (2), Kurmenty, Naryn, Rybach'e, Stalinabad, and Tashkent), 22h. (Brisbane),

Feb. 11d. Readings at 0h. (Kodaikanal, Collmberg, and Stuttgart), 1h. (near Istanbul, College, Stuttgart, Paris, Neuchatel, near Besançon, and Zürich), 3h. (Victoria and near Istanbul), 4h. (Pretoria and near Kurnemty), 6h. (College, Hungry Horse, Overton, Pierce Ferry, and Manila), 7h. (College, Tucson, near Huancayo, New Delhi, Tchimkent, Frunse, Naryn, Almata, Ili, Kurmenty, Lunacharskoe, Mary, Ashkabad, near Kulyab, Khorog, Samarkand, Stalinabad, Fergana, and Andijan), 8h. (near Tacubaya (2), Vera Cruz (2), Puebla (2), near Bogota, and near Alicante (3)), 9h. (College, Tamanrasset, Andijan, and near Ashkabad), 10h. (Tucson and Andijan), 11h. (Puebla, Vera Cruz, Tacubaya, and Overton), 12h. (near Alicante (2)), 13h. (Mary and Tortosa), 14h. (Lunacharskoe, Almata, Almata II, Chilisk, Ili, Kurmenty, near Andijan, Frunse, Krasnogorka, Naryn, Tashkent, and Tchimkent), 15h. (Apia, Hungry Horse, near Barcelona, and Tortosa). 18h. (near Barcelona and Tortosa), 19h. (Apia and College), 20h. (College, Lunacharskoe, Fergana, Tashkent, near Stalinabad, Andijan, Khorog, Kulyab, near Ashkabad, near Kurmenty, Tortosa, near Almeria, and near Mizusawa), 22h. (Perth, College (2), Tinemaha, China Lake, Riverside, Tucson, and Stuttgart), 23h. (Ksara, Tacubaya, Almata II, near Kurmenty, Ili, and Chilisk).

Feb. 12d. 3h. 31m. 40s. Epicentre 51°·9N. 179°·4E. Focus at Base of Superficial Layers. (as on 1944, September 9d.).

$A = -·6195$, $B = +·0065$, $C = +·7849$; $\delta = -11$; $h = -6$;
$D = +·010$, $E = +1·000$; $G = -·785$, $H = +·008$, $K = -·620$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		11·8	299	e 2 43	− 6	—	—	—	—	—
College		21·2	40	e 4 48	+ 3	e 8 58	sS	e 5 26	PPP	e 10·5
Vladivostok		32·8	274	e 6 20	−12	11 32	−14	—	—	—
Resolute Bay		39·7	24	7 33	+ 2	e 13 44	+12	8 23	pP	—
Shasta Dam		40·7	82	e 7 40	+ 1	—	—	—	—	—
Mineral	z.	41·4	82	i 7 46a	+ 1	—	—	—	—	—
Hungry Horse		41·5	66	e 7 46	0	—	—	—	—	—
Berkeley		42·5	86	i 7 54	0	—	—	e 8 6	pP	e 20·7
Reno		43·0	81	e 8 0k	+ 2	—	—	—	—	—
Lick	z.	43·2	86	e 8 0a	0	—	—	i 8 14	pP	—
Irkutsk		44·2	302	e 8 0	− 8	e 14 30?	− 8	—	—	—
Fresno	z.	44·8	85	e 8 10a	− 2	—	—	—	—	—
Tinemaha	z.	45·5	83	i 8 19	+ 1	—	—	—	—	—
Logan		46·5	74	i 8 27	+ 1	—	—	e 8 46	pP	—
China Lake	z.	46·7	83	i 8 27	0	—	—	i 8 40	pP	—
Pasadena		47·4	86	i 8 32	− 1	—	—	i 8 45	pP	e 22·3
Riverside	z.	48·0	86	i 8 36	− 2	—	—	e 8 50	pP	—
Overton	z.	48·2	81	i 8 39	0	—	—	—	—	—
Boulder City		48·3	82	i 8 40	0	—	—	—	—	—
Pierce Ferry		48·7	81	i 8 44	+ 1	—	—	—	—	—
Palomar	z.	48·8	86	i 8 43a	− 1	—	—	i 8 56	pP	—
Tucson		53·2	83	i 9 17	0	i 9 40	sP	i 9 30	pP	e 22·4
Scoresby Sund		57·0	8	e 9 44	− 1	—	—	—	—	27·3
Sverdlovsk		60·5	327	e 10 7	− 2	i 18 24	+ 3	—	—	—
Ottawa		63·6	49	e 10 27	− 3	—	—	—	—	e 30·7
Frunse		65·4	308	e 10 37	− 5	—	—	—	—	—
Morgantown		65·8	56	i 11 14	pP	—	—	—	—	—
Harvard		67·7	49	i 10 54	− 2	—	—	—	—	e 39·1
Palisades		67·8	51	e 20 3	SP	—	—	—	—	—
Weston		67·9	49	i 10 56	− 1	—	—	—	—	—
Andijan		68·1	308	e 10 54	− 4	i 19 53	− 1	—	—	—
Moscow		68·2	338	e 10 56	− 3	e 19 57	+ 1	—	—	—
Fergana		68·7	308	e 11 6	+ 4	—	—	—	—	—
Tashkent		69·1	311	e 11 8	+ 3	—	—	—	—	—
Kulyab		71·6	308	e 11 14	− 6	—	—	—	—	—
Mary		75·6	313	—	—	e 21 21	0	—	—	—
Ashkabad		76·8	316	e 11 48	− 2	—	—	—	—	—
Tiflis		78·8	327	e 12 1?	0	e 22 6?	+11	—	—	—
Borzhomi		79·1	329	e 12 3?	0	22 3?	+ 5	—	—	—
Stuttgart	z.	79·4	354	e 12 3?	− 1	—	—	—	—	—

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara	88·8	330	e 13 12	pP	24 8	sS	—	—	—
San Juan	89·9	60	i 12 57	0	—	—	i 13 12	pP	—
Alicante	90·1	0	e 12 42	−16	e 22 38	−69	13 6	PcP	e 38·8
Kimberley	150·1	309	i 17 13?	?	—	—	—	—	—

Additional readings :—
Resolute Bay e =9m.53s. and 14m.20s., ScS =17m.20s.
Mineral iZ =8m.28s. and 8m.36s.
Berkeley eZ =8m.18s.
Lick iPcPZ =9m.32s., iZ =10m.4s.
Logan e =9m.36s.
Alicante PP =16m.7s., PPP =17m.41s., PPS =24m.18s., SS =27m.39s., Q =33m.58s.
Long waves were also recorded at Santa Clara, Seven Falls, Granada, De Bilt, and Kew.

Feb. 12d. 8h. 24m. 42s. Epicentre 39°·2N. 20°·0E. (as on 1950, August 31d.).
Intensity V at Amphilochia ; IV at Agrinion and Leukas ; III at Astakos.
Strasbourg gives epicentre 39°·0N. 19°·8E.

A. Galomopoulos,
Seismological Institute Bulletin, 1951, Athens, 1952, p. 13.

A = +·7302, B = +·2658, C = +·6295 ; δ = +11 ; h = −1 ;
D = +·342, E = −·940 ; G = +·591, H = +·215, K = −·777.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		2·5	301	0 43	0	—	—	—	—	—
Athens		3·2	113	i 0 41	P_g	i 1 9	S_g	—	—	—
Messina		3·6	256	e 1 12	P_g	i 2 3	S_g	—	—	i 2·2
Belgrade	z.	5·6	3	e 1 37k	P*	—	—	—	—	—
Bucharest		6·9	39	e 1 49	+ 4	e 3 8	+ 3	e 3 27	S*	—
Kalossa		7·3	355	e 2 57	?	e 3 3	−12	—	—	—
Triest		7·9	327	e 1 53	− 6	e 3 44	+14	—	—	e 4·8
Prague		11·6	342	—	—	e 5 37	SSS	—	—	—
Stuttgart	z.	12·3	325	e 3 9	PP	—	—	e 3 16	PPP	e 7·3
Tamanrasset	z.	20·5	221	e 4 47	+ 5	—	—	—	—	—

Additional readings :—
Taranto e =1m.46s. and 2m.43s.
Messina iZ =1m.21s. and 1m.33s.
Belgrade eZ =2m.20s., eP_gS_gNE =2m.48s. and 3m.29s., iNW =3m.31s., eNE =3m.37s.
Bucharest eN =2m.42s., eE =3m.34s.
Kalossa eE =3m.57s., iE =4m.59s., eN =5m.6s. and 5m.28s., eE =5m.32s.
Prague e =5m.53s., eS? =6m.53s., e =7m.10s. and 7m.31s.
Stuttgart eZ =3m.22s. and 3m.41s.
Tamanrasset iZ =4m.51s.
Long waves were also recorded at Budapest.

Feb. 12d. 17h. 0m. 20s. Epicentre 47°·7N. 80°·5E.

U.S.S.R. gives epicentre as adopted.

A = +·1115, B = +·6662, C = +·7374 ; δ = +1 ; h = −5 ;
D = +·986, E = −·165 ; G = +·122, H = +·727, K = −·675.

	△	Az.	P.	O−C.	S.	O−C.	
	°	°	m. s.	s.	m. s.	s.	
Semipalatinsk	2·7	257	e 0 44	− 1	i 1 29		S_g
Chilisk	4·4	200	i 1 8	− 2	2 25		S_g
Ili	4·5	214	1 11	0	2 31		S_g
Kurmenty	4·9	199	i 1 15	− 2	2 13	−	2
Almata II	4·9	208	i 1 17	0	—		—
Almata	5·1	211	i 1 19	− 1	2 51		S_g
Krasnogorka	5·8	222	i 1 30	+ 1	2 38		0
Rybach'e	6·1	212	e 1 34	0	—		—
Frunse	6·4	223	e 1 38	0	—		—
Naryn	7·0	208	e 1 52	+ 6	3 38		S*

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Andijan		9·1	223	e 2 17	+ 3	—	—
Tchimkent		9·4	239	i 2 20	+ 2	4 7	0
Fergana		9·6	224	e 2 23	+ 2	—	—
Tashkent		10·2	236	e 2 32	+ 1	—	—
Stalinabad		12·5	227	e 3 1	− 1	e 5 21	− 2
Kulyab		12·6	223	e 2 58	− 5	—	—
Samarkand		12·6	235	e 3 5	+ 2	—	—
Sverdlovsk		15·2	314	i 3 34	− 4	—	—
Mary		17·0	240	e 4 3	+ 2	—	—
Stuttgart	z.	45·9	299	e 8 22	− 4	—	—
College		61·6	21	e 10 7	−15	—	—
Tamanrasset	z.	63·5	275	e 10 30	− 4	—	—

Feb. 12d. 17h. 22m. 0s. Epicentre 65°·0N. 137°·0E.

A = −·3108, B = +·2898, C = +·9052; δ = −3; h = −10;
D = +·682, E = +·731; G = −·662, H = +·617, K = −·425.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		14·5	116	i 3 36?	+ 8	—	—	—	—	—
Yuzno-Sakhlinsk		18·4	167	4 25	+ 7	7 59	+18	—	—	—
Irkutsk		21·0	248	4 45	− 2	i 8 39	+ 2	—	—	—
Vladivostok		22·1	189	i 5 2	+ 3	i 9 7	+ 9	—	—	—
Nemuro		22·2	163	e 5 5	+ 5	e 9 16	+16	—	—	e 12·2
Hatinohe		24·6	171	5 25	+ 2	9 51	+ 9	—	—	13·5
Akita		25·4	173	5 35	+ 4	10 11	+15	—	—	e 13·8
Morioka		25·5	173	e 5 33	+ 1	10 16	+19	—	—	e 13·4
Mizusawa		26·0	172	e 5 42	+ 6	10 19	+13	5 46	P	14·2
Mitchell Field		26·8	94	i 5 47	+ 3	—	—	—	—	—
Sendai		26·9	172	e 5 44	− 1	10 32	+12	—	—	e 14·3
Onahama		28·2	174	e 6 6	+10	e 11 0	+19	—	—	e 15·0
Matusiro	z.	28·5	178	6 0	+ 1	10 59	+13	c 12 29	Q	e 14·0
Maebasi		28·7	176	i 6 5	+ 4	e 10 59	+ 9	—	—	e 17·7
Tokyo		29·4	175	e 6 10	+ 3	e 11 6	+ 5	—	—	e 16·1
Nagoya		29·9	179	e 6 21	+ 9	—	—	c 14 20	Q	e 15·4
College		30·1	54	i 6 12	− 1	i 11 13	+ 1	e 38 10	P′P′	e 12·7
Osaka		30·4	182	e 6 17	+ 1	e 11 39	+23	i 6 51	PP	15·7
Kôti		31·5	185	e 6 34	+ 8	e 11 40	+ 6	e 7 44	PP	15·6
Hukuoka		31·7	190	e 6 35	+ 8	e 12 53	PcS	—	—	e 16·0
Kumamoto		32·4	189	e 6 42	+ 8	12 18	+30	—	—	17·3
Semipalatinsk		32·4	271	e 6 38	+ 4	—	—	—	—	—
Nanking		34·8	208	7 1	+ 7	e 12 37	+12	i 8 11	PP	15·5
Zi-ka-wei	z.	35·2	203	7 1	+ 3	e 12 39	+ 8	8 28	PP	—
Sverdlovsk		35·8	295	i 7 0	− 3	i 12 41	0	—	—	—
Resolute Bay		36·6	20	7 7	− 3	12 47	− 6	8 34	PP	—
Chilisk		38·5	266	e 7 25	− 1	—	—	—	—	—
Ili		38·7	268	e 7 27	0	—	—	—	—	—
Kurmenty		39·0	266	e 7 29	− 1	—	—	—	—	—
Almata		39·4	267	i 7 33	0	i 13 38	+ 3	—	—	—
Sitka		39·9	58	e 7 40	+ 3	e 13 50	+ 7	e 9 16	PP	i 16·7
Rybach'e		40·4	267	i 7 42	+ 1	i 13 54	+ 4	—	—	—
Frunse		40·7	269	i 7 44	0	i 13 55	0	—	—	—
Naryn		41·3	266	i 7 50	+ 1	14 9	+ 5	—	—	—
Tchimkent		43·3	273	i 8 4	− 1	—	—	—	—	—
Andijan		43·4	269	8 6	0	14 37	+ 2	—	—	—
Fergana		43·9	269	e 8 8	− 2	—	—	—	—	—
Pulkovo		44·0	316	i 8 11?	0	e 14 40?	− 3	—	—	—
Scoresby Sund		44·0	351	e 8 8	− 3	i 14 49	+ 6	e 9 50	PP	21·0
Tashkent		44·2	272	i 8 12	0	i 14 47	+ 1	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Moscow		45·0	308	e 8 14	− 5	e 14 50	− 8	—	—	—
Helsinki		45·2	320	e 8 17	− 3	e 14 55	− 6	e 10 3	PcP	—
Stalinabad		46·7	270	i 8 28	− 4	i 15 21	− 1	—	—	—
Kulyab		46·9	269	e 8 30	− 4	e 15 21	− 4	—	—	—
Upsala		47·5	323	i 8 31a	− 7	e 15 22	−12	i 10 26	PP	e 23·0
Chatra	z.	49·4	243	i 8 54	+ 1	i 15 23	−37	—	—	—
Mary		50·5	275	e 9 0	− 2	e 16 13	− 3	—	—	—
Victoria		51·0	57	e 9 6	0	16 23	+ 1	20 6	SS	28·1
Manila		51·5	199	e 9 8	− 1	i 16 28	− 1	—	—	—
Ashkabad		51·6	279	i 9 9?	− 1	—	—	—	—	—
New Delhi		51·8	255	e 9 11	− 1	i 16 27	− 6	e 11 10	PP	—
Makhach-Kala		51·9	291	9 12	0	16 31	− 4	—	—	—
Seattle		52·1	57	i 9 18k	+ 4	e 16 44	+ 6	e 12 14	PPP	e 25·0
Lund		52·2	324	9 15	0	16 36	− 3	—	—	—
Grozny		52·3	293	e 9 15	0	—	—	—	—	—
Copenhagen		52·4	324	i 9 13	− 3	16 37	− 5	11 16	PP	26·0
Calcutta	E.	52·8	240	e 9 25	+ 6	i 16 52	+ 5	20 25	SS	24·4
Baku		53·1	288	i 9 26	+ 5	e 16 55	+ 4	—	—	—
Saskatoon		53·4	43	9 22	− 2	16 52	− 3	—	—	31·2
Shemakla		53·4	289	—	—	i 16 54	− 1	—	—	—
Tiflis		54·0	292	e 9 27	− 1	i 17 3	0	—	—	—
Ivigtut		54·1	3	e 9 26	− 3	e 17 6	+ 1	—	—	26·0
Kirovobad		54·2	290	9 27	− 2	17 2?	− 4	—	—	—
Aberdeen	E.	54·3	334	—	—	i 16 54	−13	—	—	27·4
Borzhomi		54·4	294	e 9 29	− 2	—	—	—	—	—
Hungry Horse		54·4	50	i 9 30	− 1	e 17 20	+11	e 19 11	ScS	—
Lwow		54·4	313	e 9 29	− 2	17 4	− 5	—	—	—
Sotchi		54·4	298	9 30	− 1	e 17 10	+ 1	—	—	—
Zugdidi		54·4	296	e 9 34	+ 3	—	—	—	—	—
Abastumanj		54·7	294	e 9 37	+ 4	—	—	—	—	—
Theodosia		54·7	302	e 9 33	0	—	—	—	—	—
Lenkoran		54·9	287	9 36	+ 1	17 19	+ 3	—	—	—
Leninakan		55·2	292	e 9 37	0	—	—	—	—	—
Potsdam		55·3	322	e 9 41	+ 3	—	—	e 12 1	PP	e 26·0
Kishinev		55·3	308	9 34	− 4	17 14	− 7	—	—	—
Erevan		55·4	291	e 9 43	+ 5	—	—	—	—	—
Edinburgh	E.	55·6	334	9 38	− 2	17 13	−12	—	—	—
Yalta		55·6	302	9 36	− 4	e 17 20	− 5	—	—	—
Nakhichevan		55·9	290	i 10 16?	+34	18 17?	+48	—	—	—
Uzhgorod		56·0	313	i 9 40	− 3	i 17 26	− 4	—	—	—
Skalnate Pleso		56·1	315	9 44	+ 1	e 17 33	+ 1	e 11 50	PP	28·5
Durham	N.	56·4	332	e 15 39	?	i 17 28	− 8	—	—	—
Butte		56·9	50	e 9 50	+ 1	e 17 44	+ 2	e 21 34	SS	e 25·7
Prague		57·0	320	i 9 51a	+ 1	e 17 33	−10	e 23 41	SSS	e 28·0
Jena		57·0	322	e 9 46	− 4	e 17 38	− 5	e 18 2	PPS	e 28·7
Arcata	z.	57·3	63	e 9 54a	+ 2	—	—	—	—	—
De Bilt		57·5	327	i 9 49	− 4	i 17 53	+ 3	e 13 8	PPP	e 25·0
Cheb		57·5	322	9 54	+ 1	e 17 50	0	e 10 51	PcP	e 25·1
Bozeman		57·7	49	e 10 0	+ 5	e 17 48	− 5	e 13 33	PPP	e 24·1
Ogyalla		57·9	316	e 9 54	− 2	e 17 50	− 5	e 12 9	PP	—
Budapest		58·0	315	10 1	+ 4	17 52	− 5	12 6	PP	e 30·0
Shasta Dam		58·1	61	i 9 58	0	—	—	—	—	—
Bucharest		58·5	308	e 10 1	+ 1	e 14 50	PcS	—	—	28·0
Rathfarnham Castle		58·7	335	i 10 3	+ 1	e 18 7	+ 1	e 22 5	SS	e 27·0
Mineral	z.	58·7	61	i 10 3a	+ 1	—	—	i 10 49	PcP	—
Kalossa		58·9	315	e 10 7	+ 4	—	—	e 12 15	PP	—
Timisoara		58·9	312	e 10 5	+ 2	—	—	e 30 28	Q	e 33·0
Ukiah		59·1	63	—	—	e 18 18	+ 7	—	—	e 25·0
Kew		59·3	330	i 10 5	− 1	e 18 6	− 8	e 13 46	PPP	e 27·0
Karlsruhe		59·6	324	i 10 9	+ 1	e 18 19	+ 2	e 10 53	PcP	e 29·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stuttgart		59·6	323	e 10 3k	− 5	e 18 12	− 5	e 12 20	PP	e 28·0
Belgrade		60·0	312	i 10 12k	+ 1	e 18 25	+ 2	e 24 33	SSS	e 34·3
Strasbourg		60·1	324	e 10 8	− 3	e 18 21	− 3	e 10 54	PcP	e 28·3
Istanbul		60·4	304	e 10 13	0	e 18 23	− 5	e 12 25	PP	e 31·0
Berkeley	Z.	60·6	63	e 10 16	+ 1	e 18 37	+ 7	e 22 48	SS	e 31·4
Logan		60·9	52	e 10 17	0	e 18 35	+ 1	e 12 31	PP	e 31·4
Zürich		61·0	322	i 10 13k	− 5	e 18 31	− 4	i 10 17	P	—
Basle		61·1	323	e 10 15	− 3	e 17 54	−43	e 11 9	PcP	—
Hyderabad		61·2	248	i 10 17	− 2	i 18 37	− 1	—	—	28·3
Paris		61·2	327	e 10 15	− 4	i 18 38	0	e 11 3	PcP	e 28·0
Santa Clara	E.	61·2	63	—	—	e 18 47	+ 9	—	—	—
Triest		61·2	318	i 10 20	+ 1	i 18 34	− 4	i 12 35	PP	e 34·5
Chur		61·3	321	e 10 16	− 4	—	—	—	—	e 31·5
Lick	Z.	61·3	63	i 10 21k	+ 1	—	—	i 11 6	PcP	—
Rapid City	E.	61·6	45	e 10 24	+ 2	e 18 45	+ 2	e 12 46	PP	e 25·7
Besançon		61·8	324	e 10 20	− 3	—	—	e 11 6	PcP	—
Salt Lake City		61·8	53	i 10 23	0	i 18 47	+ 1	e 25 42	SSS	—
Poona		62·1	253	i 10 28	+ 3	i 18 46	− 3	11 0	PcP	28·6
Salo	Z.	62·1	320	e 10 26	+ 1	e 20 40	ScS	e 11 3	PcP	—
Bombay		62·2	254	e 10 27	+ 1	e 18 52	+ 1	23 10	SS	28·6
Fresno		62·5	61	e 10 28a	0	e 18 58	+ 4	e 14 56	PcS	—
Padova		62·8	318	e 10 35	+ 5	18 50	− 8	12 53	PP	e 30·7
Tinemaha		62·8	60	e 10 32	+ 2	e 19 5	+ 7	—	—	—
Bologna		62·9	319	e 10 37	+ 7	e 19 25	PPS	—	—	—
Pavia		62·9	321	e 10 30k	0	e 19 1	+ 1	—	—	e 30·6
Clermont-Ferrand		63·9	326	i 10 30	− 7	e 18 50	−22	i 10 6	?	e 26·5
China Lake	Z.	64·2	60	i 10 38	− 1	—	—	e 39 23	P'P'	—
Ksara		64·3	295	i 10 37a	− 2	19 25	+ 8	—	—	—
Overton	Z.	64·7	57	i 10 43	+ 1	19 29	+ 7	e 39 20	P'P'	—
Taranto		64·9	313	e 10 45	+ 2	—	—	—	—	30·9
Athens		65·0	306	e 10 41	− 3	—	—	—	—	—
Boulder City		65·0	57	e 10 44	0	e 19 29	+ 3	e 39 30	P'P'	—
Rome		65·0	317	i 10 41k	− 3	i 19 28	+ 2	13 5	PP	e 30·4
Rocca-di-Papa		65·1	317	e 13 6	PP	e 26 9	SSS	—	—	—
Pierce Ferry		65·2	57	i 10 47	+ 2	e 20 46	ScS	e 38 50	P'P'	—
Pasadena		65·4	61	i 10 48	+ 1	e 19 32	+ 2	e 39 24	P'P'	—
Riverside	Z.	65·9	61	i 10 50	0	—	—	e 39 23	P'P'	—
Seven Falls	E.	66·1	20	10 48	− 3	19 42	+ 3	23 57	SS	29·0
Shawinigan Falls	N.	66·4	21	e 10 49	− 4	e 19 37	− 6	—	—	39·0
Lincoln	E.	66·5	42	e 10 54	0	e 19 31	−13	e 23 33	SS	—
Palomar		66·6	60	i 10 56	+ 2	—	—	—	—	—
Ottawa		67·0	24	10 52k	− 5	19 42	− 8	—	—	e 36·0
Chicago		68·0	34	e 11 6	+ 3	e 19 53	− 9	e 24 27	SS	e 30·2
Kodaikanal	E.	68·2	246	e 11 14	+10	e 20 9	+ 5	28 20	Q	31·5
Lawrence		68·7	41	i 11 4	− 3	—	—	—	—	—
Buffalo		68·8	27	e 11 7	− 1	e 20 11	0	—	—	—
Helwan		69·6	297	11 11	− 2	20 18	− 3	21 10	SKS	—
Cleveland		69·7	30	i 11 10a	− 4	e 20 17	− 5	e 21 11	SKS	—
Tucson		69·8	56	e 11 15	+ 1	e 20 22	− 1	e 13 56	PP	32·6
Florissant		70·1	38	i 11 19	+ 3	i 20 24	− 3	e 21 17	SKS	—
Colombo	E.	70·3	242	10 3	?	20 33	+ 4	—	—	35·0
St. Louis		70·3	38	i 11 14	− 3	e 20 21	− 8	—	—	—
Harvard		70·5	22	i 11 16	− 2	e 20 22	−10	—	—	e 34·5
Weston		70·7	22	i 11 17	− 3	—	—	—	—	—
Pittsburgh		71·0	28	i 11 21	− 1	e 20 28	− 9	—	—	—
Pennsylvania	N.	71·1	27	i 11 19	− 3	i 20 29	− 9	i 11 23	P	e 28·3
Toledo		71·1	329	e 11 20	− 2	e 20 41	+ 3	e 13 58	PP	34·8
Palisades		71·6	23	i 11 23	− 2	e 20 37	− 7	—	—	e 39·9
Alicante		71·8	326	11 18	− 8	19 46	−60	11 37	PcP	e 32·4
Fordham		71·8	23	i 11 22	− 4	i 20 39	− 7	—	—	—

Continued on next page.

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Algiers Univ.	z.	72·4	322	e 11 26	− 4	—	—	11 49	PcP	—
Philadelphia		72·4	25	e 11 25	− 5	e 20 45	− 8	e 25 24	SS	e 28·8
Almeria		73·6	327	i 11 39	+ 2	i 21 3	− 4	14 23	PP	39·1
Granada		73·6	328	i 11 41k	+ 4	21 10	+ 3	21 43	PS	i 35·8
Malaga		74·2	328	i 11 39	− 1	21 3	−11	16 17	PPP	35·3
Columbia		77·0	31	e 11 55	− 1	i 21 33	−12	i 14 48	PP	33·2
Tamanrasset	z.	84·9	316	e 12 36	− 2	e 23 0	− 6	e 12 41	PcP	40·0
Tacubaya		85·7	52	e 12 49	+ 7	e 23 22	+ 8	—	—	—
San Juan		95·0	22	e 13 26	0	i 24 0	[− 1]	e 17 12	PP	—
Riverview		99·1	168	e 13 50	+ 6	i 24 18	[− 5]	i 26 50	PS	e 42·8
Bogota		106·9	32	e 18 45	PP	e 24 58	[− 1]	e 27 50	PS	e 50·0
Pretoria	z.	121·0	275	i 18 56	[+ 1]	—	—	—	—	—
Huancayo		122·6	37	e 19 2	[+ 4]	e 37 10	SS	e 20 31	PP	e 52·0
Kimberley		125·0	277	i 19 33?	[+31]	—	—	—	—	—
Grahamstown	z.	128·2	273	i 19 4	[− 5]	—	—	—	—	—
La Paz		128·6	31	19 12	[+ 3]	26 20	[+ 4]	i 38 30	SS	58·0

Additional readings :—
Tokyo iNZ = 11m.15s.
College i = 7m.3s., 9m.25s., and 11m.50s.
Huknoka eN = 12m.5s.
Nanking PP?NZ = 8m.0s.
Zi-ka-wei iZ = 7m.7s., iS?Z = 12m.50s., SSZ = 15m.15s.
Resolute Bay SS = 15m.0s.
Scoresby Sund i = 8m.13s., eS = 14m.32s., ? = 18m.12s.
Helsinki eZ = 8m.21s., ePPN = 10m.6s., eSSN = 18m.11s.
Upsala iP? = 8m.37s., ipP = 8m.55s., iPPN = 10m.21s., iN = 10m.39s., i = 10m.50s., eN = 11m.35s., eE = 11m.44s., eN = 11m.48s., e = 12m.15s., iScS?E = 18m.15s., iE = 19m.16s., i = 20m.30s., e = 21m.13s.
Manila iPPN = 10m.1s.
New Delhi PPPEN = 12m.13s., iEN = 15m.25s., ScSEN = 18m.57s., SSEN = 19m.57s., SSSEN = 21m.33s.
Seattle iPcP = 10m.29s., ePP = 11m.10s., eScS = 19m.4s., eSS = 20m.50s., and numerous unidentified readings.
Copenhagen i = 9m.18s.
Calcutta PcPE = 10m.45s., PPE = 11m.24s., PcSE = 14m.39s., PSE = 17m.3s., PPSE = 17m.21s.
Aberdeen iSE = 18m.17s., iE = 20m.3s., eE = 24m.6s.
Hungry Horse ePKP,PKP? = 39m.15s.
Potsdam eE = 15m.12s. and 18m.9s., eN = 18m.16s.
Skalnate Pleso e = 10m.13s., ePPP = 12m.36s., e = 13m.25s. and 14m.24s., eS? = 17m.19s., e = 18m.13s. and 19m.13s., eSS = 21m.24s., eSSS = 22m.17s., e = 22m.53s. and 23m.30s.
Butte ePP? = 12m.22s., ePPP = 13m.24s.
Prague eE = 10m.2s., iN = 10m.10s., eN = 10m.35s., e = 11m.1s., ePPE = 12m.16s., ePPN = 12m.21s., e = 12m.36s., 13m.28s., and 19m.30s., eSS = 21m.44s.
Jena iPN = 9m.50s., eE = 10m.29s., eN = 10m.36s., eE = 11m.7s., eN = 12m.18s., eE = 12m.25s. and 13m.12s., eN = 13m.20s., eSN = 17m.25s., eE = 19m.46s.
Cheb eN = 10m.26s., ePcP?N = 10m.40s., e = 12m.6s., ePP = 12m.28s., ePPP = 13m.2s., e = 15m.2s., 16m.21s., and 17m.17s., eS? = 17m.35s., eSS = 21m.42s., eSSS = 24m.12s.
Bozeman ePP? = 12m.38s., eSS = 22m.12s.
Ogyalla eN = 10m.8s., e = 10m.23s., eN = 11m.27s., ePPP? = 12m.44s., eE = 14m.27s., eN = 16m.30s., eE = 17m.37s., e = 18m.23s., eN = 19m.32s., e = 20m.42s., eSSS = 24m.36s.
Budapest PPPE = 13m.26s., PPSN = 18m.26s., PPSE = 18m.29s., SSN = 22m.0s., eSSE = 22m.10s., eE = 26m.32s., eN = 27m.38s.
Bucharest eN = 21m.19s., eE = 26m.15s.
Rathfarnham Castle eZ = 11m.25s., ePPEN = 12m.7s., e = 20m.3s.
Mineral iZ = 10m.8s., 11m.58s., 12m.54s., and 13m.45s.
Kalossa eE = 12m.7s.
Kew ePPZ = 12m.12s., eSKS?EN = 19m.54s., eSSN = 22m.26s., eSSSEN = 24m.42s.
Stuttgart iP = 10m.8s., ePcPZ = 10m.49s., eZ = 11m.12s., ePPP = 13m.44s., eScS = 20m.0s., eSS = 22m.8s., e = 25m.30s.
Belgrade eZ = 12m.18s., eNW = 28m.11s., eNE = 30m.58s.
Strasbourg i = 10m.13s., e = 10m.34s., i = 11m.8s. and 11m.39s., e = 13m.26s., ePPP = 13m.46s., ePPS = 18m.52s., e = 19m.23s. and 19m.39s., eScS = 20m.4s., eSS = 22m.14s., e = 24m.14s.
Istanbul eZ = 10m.18s.
Berkeley eZ = 10m.35s.
Logan i = 11m.20s., eSS = 22m.59s.
Zürich e = 10m.49s.
Paris i = 10m.19s., iPP = 12m.28s., ePPP = 13m.57s., iPPP = 14m.5s., iPcS = 15m.15s., eS = 18m.31s., iScS = 20m.10s., i = 20m.43s. and 22m.7s., iSS = 22m.19s., eSSS = 24m.45s.?.

Continued on next page.

Triest eSPZ = 18m.59s., eSS – 22m.36s.
Lick iZ = 10m.26s., 10m.37s., and 10m.47s., eZ = 14m.15s.
Rapid City eSS?E = 23m.17s.
Besançon iP = 10m.24s., e = 10m.50s., 11m.28s., 11m.49s., and 12m.11s.
Salt Lake City ePP? = 13m.16s., ePPP? = 14m.46s.
Poona PPE = 12m.40s., PPPE = 14m.11s., PcPE = 14m.56s., PSE = 18m.58s., PPSE = 19m.6s., ScSE = 19m.38s., SSE = 22m.34s., SSSE = 25m.10s., QE = 25m.43s.
Salo eZ = 11m.52s., eS?Z = 18m.2s.
Bombay SSE = 22m.15s., QE = 25m.26s.
Fresno eZ = 10m.47s., eE = 11m.18s., ePP?E = 13m.1s.
Pavia e = 12m.9s., iS = 18m.32s.
Clermont-Ferrand i = 10m.24s. and 11m.44s.
Taranto e = 15m.40s.
Rome i = 10m.46s., ePPP? = 14m.33s., eSS?N = 23m.47s., SSS = 26m.17s.
Seven Falls SSSE = 26m.42s.
Helwan eZ = 11m.33s., PPZ = 13m.48s., PPPZ = 15m.28s.
Cleveland iSN = 20m.14s., eE – 20m.35s., eN = 28m.31s.
Tucson ePPP = 15m.32s., eSS? = 25m.45s., eSSS = 28m.11s., ePKP,PKP = 39m.15s.
Florissant i = 20m.43s.
Toledo i = 11m.24s., SS = 25m.28s., SSS = 28m.43s.
Alicante PP = 13m.33s., Q = 27m.47s.
Algiers Univ. eZ = 11m.31s. and 13m.54s., ePPZ = 14m.6s.
Almeria PcP = 11m.55s., PPP = 16m.5s.
Granada PcP = 12m.13s., PP = 14m.16s., PPP = 15m.58s., SS = 25m.16s., SSS = 27m.52s.
Malaga PP = 14m.17s.
Columbia eSS = 26m.27s., eSSS? = 30m.19s.
Tamanrasset ePPZ = 15m.51s., eZ = 18m.55s., eSSZ = 28m.0s.?.
Riverview iN = 24m.31s., eSSSE = 36m.1s.
Bogota eSE = 27m.18s., eSSEN = 33m.45s., eEN = 42m.0s.
Huancayo e = 40m.12s., eSSS = 42m.19s.
La Paz ePP = 21m.15s., iSSS = 42m.54s.
Long waves were also recorded at Reykjavik, Tortosa, Barcelona, Fort de France, Bergen, Wellington, Christchurch, Dehra Dun, and Galerazamba.

Feb. 12d. Readings also at 2h. (Boulder City and near Overton), 4h. (near Messina, Taranto, and near Klyuchi), 6h. (Boulder City), 8h. (near Khorog, Kulyab, Fergana, Andijan, Almata II, Ashkabad, and Naryn), 10h. (near Tacubaya), 11h. (Overton), 12h. (Grahamstown and near Alicante), 13h. (Pretoria), 14h. (Apia and Stuttgart), 15h. (College), 16h. (Ksara and Weston), 17h. (near Dzhergetal, Khorog, Obi-garm, Stalinabad, near Chilisk, Ili, and Kurmenty), 18h. (Abastumanj, Shemakla, near Grozny, Gandzha, Leninakan, Makhach-Kala, Tiflis, Tsikhlis-Dzhvari, near Klyuchi (2), Vladivostok, Tamanrasset, College (3), Lick, Mineral, Boulder City, Overton, Pierce Ferry, Hungry Horse (4), and Resolute Bay), 19h. (Riverside, China Lake, Overton, Pierce Ferry, and near Klyuchi), 21h. (Chatra, Overton (2), Hungry Horse (2), and College), 22h. (Overton, Pierce Ferry, Boulder City, Hungry Horse, and College), 23h. (Pierce Ferry, Hungry Horse, and College).

Feb. 13d. 0h. 46m. 15s. Epicentre 0°·7S. 98°·1E. (as on 1937, November 28d.).

$A = -\cdot1409$, $B = +\cdot9899$, $C = -\cdot0122$; $\delta = -10$; $h = +7$;
$D = +\cdot990$, $E = +\cdot141$; $G = +\cdot002$, $H = -\cdot012$, $K = -1\cdot000$.

		△	Az.	P.	O–C.	S.	O–C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Djakarta		10·3	122	e 2 34	+ 2	e 5 46	L	—	—	(e 5·8)
Bandong		11·3	123	e 2 42	– 4	e 6 0	L	—	—	(e 6·0)
Colombo	E.	19·7	293	4 30	– 4	9 23	Q	—	—	12·6
Kodaikanal	E.	23·2	299	5 16	+ 7	9 22	+ 4	6 58	?	—
Calcutta	E.	25·0	339	1 10	?	10 2	+13	5 45	P	17·0
Hyderabad		26·4	314	e 5 41	+ 1	10 8	– 4	—	—	—
Manila		27·3	55	e 5 51	+ 3	/	—	—	—	—
Chatra	Z.	29·4	342	i 6 8	+ 1	—	—	—	—	—
Poona	E.	30·6	310	6 18	0	11 20	0	13 18	SSS	15·3
Bombay		31·6	310	e 6 33	+ 7	e 11 40	+ 5	—	—	—
New Delhi	N.	35·3	327	i 5 43	?	i 15 1	SS	i 15 53	Q	e 17·8
Perth		35·3	153	—	—	i 15 43	SS	—	—	—
Zi-ka-wei	Z.	38·7	33	i 7 30	+ 3	e 16 58	SSS	—	—	—
Kulyab		46·5	329	e 8 29	– 2	e 15 16	– 3	—	—	—
Naryn		46·5	338	i 8 33	+ 2	e 15 22	+ 3	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kurmenty		47·1	342	e 8 35	0	—	—	—	—	—
Rybach'e		47·3	339	e 8 35	− 2	—	—	—	—	—
Andijan		47·4	333	e 8 38	0	i 15 35	+ 3	—	—	—
Fergana		47·4	333	e 8 37	− 1	—	—	—	—	—
Stalinabad		47·5	329	e 8 36	− 2	15 29	− 5	—	—	—
Almata		47·7	340	e 8 40	0	i 15 40	+ 4	—	—	—
Frunse		48·3	337	i 8 45	0	i 15 48	+ 3	—	—	—
Ili		48·3	341	i 8 43	− 2	—	—	—	—	—
Samarkand		49·2	328	e 8 51	− 1	—	—	—	—	—
Tashkent		49·3	332	—	—	e 15 53	− 6	—	—	—
Tchimkent		49·9	333	i 8 55	− 2	i 16 7	0	—	—	—
Mary		50·7	323	9 3	0	—	—	—	—	—
Irkutsk		53·0	5	9 21	0	i 16 56	+ 6	—	—	—
Ashkabad		53·1	321	e 9 21	0	—	—	—	—	—
Vladivostok		53·1	31	i 9 21	0	i 16 57	+ 6	—	—	—
Riverview		59·5	129	i 10 11a	+ 4	i 18 16	0	e 21 55	SS	e 25·0
Baku		60·0	319	e 10 13	+ 2	—	—	—	—	—
Nakhichevan		62·4	316	13 45?	PPP	19 4?	PS	—	—	—
Makhach-Kala		62·7	320	e 10 18	−11	—	—	—	—	—
Tiflis		63·9	318	e 10 35	− 2	e 19 10	− 2	—	—	—
Grozny		64·1	320	e 10 38	0	—	—	—	—	—
Sverdlovsk		64·8	339	i 10 40	− 3	19 21	− 2	—	—	—
Borzhomi		64·9	318	e 10 49	+ 6	—	—	—	—	—
Abastumanj		65·3	317	e 10 56	+10	—	—	—	—	—
Zugdidi		66·2	318	e 10 56	+ 4	—	—	—	—	—
Ksara		67·6	307	e 11 3k	+ 2	21 25?	PPS	—	—	—
Helwan		70·3	302	e 11 19	+ 2	19 49	−40	13 57	PP	—
Yalta		72·2	317	11 28	− 1	20 47	− 4	—	—	—
Moscow		74·4	329	e 11 40	− 2	e 21 12	− 4	—	—	—
Istanbul		74·8	313	e 11 45	+ 1	e 21 12?	− 8	—	—	—
Pulkovo		79·6	332	—	—	e 22 8	− 4	—	—	—
Lwow		80·3	321	e 12 14	0	e 22 17	− 3	—	—	—
Uzhgorod		81·2	319	e 12 19?	0	e 22 29?	0	—	—	—
Upsala		85·8	330	—	—	e 23 12	− 3	e 24 56	PPS	—
Collmberg	z.	87·5	321	e 12 56	+ 5	—	—	—	—	—
Copenhagen		88·1	326	e 12 53	− 1	e 23 34	− 3	—	—	49·8
Jena		88·3	320	e 12 57	+ 3	—	—	—	—	—
Stuttgart		89·8	319	e 13 1	− 1	e 23 53	0	—	—	e 53·8
Strasbourg		90·7	319	e 13 9	+ 3	e 24 3	+ 2	—	—	e 36·8
De Bilt		92·4	322	e 24 45	S	(e 24 45)	+29	—	—	e 53·8
Tamanrasset	z.	92·7	293	e 13 15	0	—	—	—	—	—
Kew		95·8	322	—	—	e 24 43	− 2	—	—	e 53·8
College		100·7	22	e 17 53	PP	e 24 35	[+ 5]	e 33 18	SSP	e 44·4
Resolute Bay		105·3	4	—	—	e 24 55	[+ 3]	e 25 55	S	—
Hungry Horse		125·0	25	e 19 3	[+ 1]	—	—	—	—	—
Logan		131·0	29	—	—	e 22 39	PKS	—	—	—
China Lake	z.	131·8	39	e 19 13	[− 2]	e 22 36	PKS	—	—	—
Seven Falls	E.	132·8	349	—	—	e 39 27	SS	—	—	66·8
Overton	z.	133·3	37	e 19 20	[+ 2]	e 22 43	PKS	e 21 52	PP	—
Pierce Ferry		133·9	37	e 19 29	[+10]	—	—	—	—	—
Tucson		138·4	37	e 19 17	[−11]	—	—	e 22 16	PP	—
Bogota		171·3	—	e 25 32	PP	—	—	e 29 8	PPP	e 94·4

Additional readings and note :—
Calcutta eP?E = −2m.56s., PPSE =6m.27s., SKSE =6m.55s., SSSE =12m.49s., QE = 13m.48s., PKKSE =20m.0s. Timing wrong.
Poona PPE =8m.29s., PKSE =9m.48s., SKKKSE =15m.33s., SKSPE =18m.19s., PSE =18m.29s., PPSE =20m.11s., SSE =24m.33s., SSPE =25m.5s.
Kodaikanal SSSE =28m.20s., QE =37m.55s., RE =44m.55s.
Bombay eEN =14m.19s., N =22m.37s., E =26m.14s.
New Delhi eN =7m.6s. and 11m.53s., iN =13m.28s., eN =25m.36s.
Indian readings are given as for a very distant shock, P being usually given as PKP and S as PPP.
Helwan eZ =13m.24s.
Upsala eE =24m.0s., eN =31m.24s.
Stuttgart ePPZ =17m.21s., ePPS? =27m.51s.
College e =30m.33s.
Resolute Bay e =27m.57s. and 32m.9s.
Long waves were also recorded at Christchurch, Wellington, Tananarive, Nanking, La Plata, Ottawa, Scoresby Sund, Almeria, and Granada.

Feb. 13d. 6h. 16m. 41s. Epicentre 24°·5N. 109°·0W. (as on 1948, Sept. 1d.).

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

A = −·2966, B = −·8614, C = +·4124; δ = +6; h = +3;
D = −·946, E = +·326; G = −·133, H = −·390, K = −·911.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mazatlan		2·7	119	0 45	0	1 14	− 5	—	—	—
Tucson		7·8	350	e 1 58	0	e 3 40	+12	e 2 26	P_g	e 4·1
Tacubaya		10·4	117	e 2 38	+ 4	—	—	—	—	e 5·4
Palomar	z.	11·2	324	i 2 49	+ 5	—	—	i 3 3	PPP	—
Riverside	z.	11·9	325	e 3 6	PP	—	—	—	—	—
Pierce Ferry		12·3	341	i 3 1	+ 2	—	—	—	—	i 6·9
Boulder City		12·5	338	e 3 3	+ 1	—	—	—	—	e 7·3
Pasadena		12·5	324	i 3 16	PP	—	—	—	—	e 5·9
Overton	z.	12·8	340	i 3 8	+ 2	—	—	—	—	e 7·2
China Lake	z.	13·5	329	e 3 14	− 1	—	—	i 3 27	PP	—
Tinemaha	z.	14·8	330	e 3 34	+ 2	—	—	—	—	—
Fresno	z.	15·3	325	e 3 39a	0	—	—	—	—	—
Lick	z.	16·7	323	e 4 0a	+ 3	—	—	e 4 12	PP	—
Logan		17·4	353	e 4 4	− 2	—	—	—	—	e 9·5
Berkeley		17·5	323	e 6 13	?	e 7 37	PP	—	—	e 8·9
Reno		17·5	333	e 4 4	− 3	—	—	—	—	e 11·9
Mineral	z.	19·0	330	e 4 23k	− 3	—	—	i 4 50	PPP	—
Rapid City	E.	20·1	11	e 4 37	− 1	e 8 33	+14	—	—	e 11·1
Hungry Horse		24·1	353	e 5 14	− 4	—	—	—	—	—
Harvard		35·7	50	e 6 58	− 4	—	—	—	—	—
College		47·5	339	e 8 32	− 6	—	—	—	—	e 25·8

Mineral gives also iZ = 4m.37s.
Long waves were also recorded at Guadalajara, Vera Cruz, Seattle, Palisades, Weston, Ottawa, Seven Falls, Resolute Bay, Scoresby Sund, and Kew.

Feb. 13d. 8h. 50m. 13s. Epicentre 14°·5N. 90°·5W. (as on Jan. 20d.).

U.S.C.G.S. suggests a depth of 100km.

A = −·0085, B = −·9685, C = +·2488; δ = −3; h = +6;
D = −1·000, E = +·009; G = −·002, H = −·249, K = −·969.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida		6·4	7	e 2 2	P_g	i 3 19	S*	—	—	—
Oaxaca		6·5	293	e 1 40	+ 1	i 2 42	−13	—	—	—
Vera Cruz		7·1	312	e 2 1	P*	i 3 0	−10	—	—	—
Puebla		8·6	303	e 2 9	0	i 3 30	−18	—	—	—
Tacubaya		9·6	302	e 2 23	+ 2	i 3 56	−16	—	—	—
Chinchina		17·4	118	e 4 17	PP	—	—	—	—	—
Bogota		18·9	118	e 4 34	+10	e 8 25	SS	—	—	—
Columbia		21·2	21	i 4 57	+ 8	i 8 52	+11	i 5 17	pP	e 11·0
St. Louis		24·0	1	i 5 22	+ 5	e 9 38	+ 6	e 10 24	SS	—
Florissant		24·2	1	e 5 23	+ 4	e 9 33	− 2	—	—	—
Tucson		25·6	318	i 5 31	− 1	e 10 2	+ 3	e 5 52	pP	e 13·5
Palisades		30·1	27	i 6 17	+ 4	e 11 18	+ 6	—	—	—
Pierce Ferry		30·1	321	i 6 12	− 1	—	—	—	—	—
Huancayo		30·4	149	e 6 17	+ 1	e 11 12	− 4	—	—	—
Palomar	z.	30·4	314	i 6 13a	− 3	—	—	i 6 29	pP	—
Boulder City		30·5	320	i 6 16	− 1	e 16 47	ScS	i 6 32	pP	—
Overton	z.	30·6	321	i 6 17	− 1	e 16 58	ScS	—	—	—
Riverside	z.	31·1	314	e 6 19	− 3	—	—	i 6 34	pP	—
Rapid City	E.	31·4	343	e 7 44	PPP	e 11 31	− 1	—	—	e 13·0
Mount Wilson	z.	31·7	314	i 6 25	− 2	—	—	—	—	—
China Lake	z.	32·2	318	i 6 29	− 3	—	—	i 6 45	pP	—
Harvard		32·3	28	i 6 37	+ 4	—	—	—	—	—
Weston		32·3	28	e 6 37	+ 4	—	—	—	—	—
Logan		32·8	331	e 6 36	− 1	—	—	e 7 12	pP	—
Ottawa		33·2	19	e 6 43	+ 3	e 12 4	+ 4	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha	Z.	33·4	318	i 6 40	− 2	—	—	i 9 22	PcP	—
Fresno	Z.	34·2	317	e 6 45k	− 4	—	—	—	—	—
Lick	Z.	35·8	316	i 7 1a	− 2	—	—	i 7 17	pP	—
Reno	Z.	35·8	321	e 7 2a	− 1	—	—	e 7 19	pP	—
Mineral	Z.	37·4	320	e 7 15k	− 1	—	—	i 7 31	pP	—
Hungry Horse		38·9	336	i 7 29	0	e 13 56	+28	—	—	—
Victoria	Z.	43·4	329	i 8 4a	− 2	—	—	—	—	—
College		63·4	337	e 10 29	− 5	—	—	i 11 6	pP	—

Additional readings :—
Columbia esS =9m.25s.
St. Louis i =5m.38s., e =6m.41s.
Florissant e =9m.47s.
Boulder City iPcP =9m.15s.
Riverside iPcPZ =9m.15s.
China Lake iPcPZ =9m.18s.
Tinemaha iZ =6m.57s.
Lick iPcPZ =9m.25s.
Reno eE =7m.39s.
Mineral ePcPZ =9m.33s.
Long waves were also recorded at Guadalajara, Resolute Bay, and Scoresby Sund.

Feb. 13d. 11h. 55m. 49s. Epicentre 15°·4S. 174°·6W. Depth of focus 0·030.
(as on 1950, Sept. 15d.).

A = −·9603, B = −·0908, C = −·2639 ; δ = +6 ; h = +6 ;
D = −·094, E = +·996 ; G = +·264, H = +·025, K = −·965.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		3·2	60	1 0	+ 6	1 44	+ 9	—	—	—
Tuai	N.	24·4	195	e 4 28	−31	e 9 17	+17	—	—	—
New Plymouth	E.	25·6	200	e 5 10	0	—	—	—	—	—
Wellington		27·4	197	i 5 21	− 6	e 9 44	− 5	e 6 11?	PP	—
Cobb River	E.	27·9	201	i 5 28	− 3	e 9 49	− 8	—	—	—
Kaimata	N.E.	29·6	201	e 5 42	− 4	—	—	—	—	—
Christchurch		30·1	198	i 5 47	− 4	i 10 23	− 9	6 37	pP	—
Brisbane		32·3	243	i 6 7k	− 3	i 10 59	− 7	i 7 4	pP	i 14·3
Riverview		35·9	233	i 6 38k	− 2	i 11 54	− 7	i 7 16	pP	—
Honolulu		40·0	25	e 7 15	0	e 13 2	− 1	i 8 50	PP	e 16·2
Guam		49·4	304	8 28	− 1	—	—	—	—	—
Perth		64·8	242	11 11	pP	i 18 41	+ 3	19 49	sS	—
Tokyo		66·7	321	i 10 27	− 2	e 18 59	− 2	i 11 29	sP	—
Hunatu		67·2	321	e 10 7	−25	e 19 10	+ 3	—	—	—
Maebasi		67·6	321	e 10 21	−13	e 19 13	+ 1	—	—	—
Owase		67·9	318	11 29	pP	e 20 15	PS	—	—	—
Matusiro		68·2	321	e 10 36	− 2	e 19 16	− 3	e 38 53	P′P′	—
Miyazaki		69·9	313	10 47	− 1	19 37	− 2	i 20 40	PS	—
Kagosima		70·3	312	e 10 51	0	19 46	+ 2	—	—	—
Hukuoka		71·5	314	e 11 3	+ 5	e 20 0	+ 3	—	—	e 29·0
Santa Clara		72·1	41	e 11 9	+ 7	e 20 9	+ 5	—	—	—
Berkeley		72·2	41	i 11 4k	+ 2	i 20 11	+ 6	e 11 55	pP	—
Lick		72·3	41	i 11 4k	+ 1	e 20 13	+ 7	i 12 5	pP	—
Ukiah		72·4	40	e 11 10	+ 7	i 20 13	+ 6	e 13 56	PP	e 30·0
Pasadena		72·8	46	i 11 7k	+ 1	e 20 12	0	i 12 6	pP	e 29·8
Arcata		73·0	37	e 11 0	− 7	e 20 7	− 7	e 11 20	PcP	—
Fresno		73·2	43	i 11 9a	+ 1	e 20 37	+21	e 12 3	pP	—
Palomar		73·3	48	i 11 9k	0	i 20 22	+ 5	i 12 11	pP	—
Riverside		73·3	46	i 11 9k	0	e 20 19	+ 2	i 12 20	sP	—
Shasta Dam		73·9	39	i 11 12	0	—	—	—	—	—
China Lake		74·1	45	i 11 14k	+ 1	e 20 29	+ 3	i 12 17	pP	—
Mineral		74·1	40	i 11 14k	+ 1	e 20 29?	+ 3	—	—	—
Klyuchi		74·4	347	i 11 14	− 1	i 20 31	+ 1	e 12 10	pP	—
Tinemaha		74·4	43	i 11 17k	+ 2	i 20 33	+ 3	e 38 44	P′P′	—
Reno		74·8	41	i 11 19k	+ 2	e 20 37	+ 3	e 12 20	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Boulder City		76·1	47	i 11 26	+ 1	i 20 53	+ 5	i 12 28	pP	—
Vladivostok		76·1	323	i 11 23	− 2	i 20 53	+ 5	i 12 23	pP	—
Bandong		76·4	267	i 11 21	− 5	e 20 36	−16	—	—	—
Overton	z.	76·7	46	i 11 29	+ 1	i 21 1	+ 6	e 38 40	P′P′	—
Pierce Ferry		76·8	47	i 11 29	÷ 1	i 21 0	+ 4	e 38 41	P′P′	—
Zi-ka-wei	z.	76·9	309	i 11 28	− 1	21 2	+ 5	12 28	pP	—
Tucson		77·2	50	i 11 33	+ 2	e 20 48	−12	i 12 29	pP	e 31·5
Djakarta		77·4	267	i 11 37	÷ 5	i 21 6	+ 4	—	—	—
Seattle		78·2	33	i 11 38k	+ 2	i 21 15	+ 4	i 12 43	pP	—
Victoria		78·2	32	e 11 35	− 1	21 10	− 1	38 32	P′P′	34·2
Nanking		79·3	308	i 11 41k	− 1	21 23	+ 1	i 12 44	pP	—
Sitka		79·6	20	i 11 39	− 5	i 21 17	− 8	i 12 40	pP	e 32·9
Salt Lake City		80·6	43	i 11 50	+ 1	i 21 37	÷ 1	e 27 1	SS	e 32·3
Logan		81·1	42	i 11 52	0	e 21 40	− 1	i 12 50	pP	e 33·2
Tacubaya		81·8	67	e 12 2	+ 7	e 21 52	+ 4	—	—	—
College		82·6	11	i 11 58	− 1	i 21 50	− 6	i 12 57	pP	e 33·7
Puebla		82·6	67	e 12 5	+ 6	e 22 1	+ 5	—	—	—
Butte		82·8	38	e 11 59	− 1	e 21 55	− 3	e 12 59	pP	e 34·4
Hungry Horse		83·1	36	i 12 1	− 1	e 22 0	− 1	e 38 19	P′P′	—
Bozeman		83·5	39	e 12 5	+ 1	e 22 3	− 2	e 13 4	pP	e 34·4
Vera Cruz		84·5	68	e 12 11	+ 2	22 10	− 5	—	—	—
Rapid City	E.	87·8	43	e 12 27	+ 2	i 22 33	[+ 4]	e 13 25	pP	e 34·8
Merida		90·9	68	—	—	e 23 2?	SKKS	—	—	—
Lincoln	E.	91·1	47	e 12 46	+ 6	i 22 53	[+ 4]	e 23 24	S	—
St. Louis		95·2	51	i 13 1	÷ 2	i 23 14	[+ 2]	i 14 1	pP	—
Huancayo		95·6	104	e 13 5	+ 4	e 23 21	[+ 7]	e 14 6	pP	e 38·2
Irkutsk		96·7	322	13 5	− 1	24 5	+ 1	e 14 6	pP	—
Chicago		97·9	48	e 17 16	PP	i 23 25	[− 1]	e 24 27	S	e 48·0
Chinchina		99·9	87	e 13 25	+ 5	e 23 40	[+ 5]	26 13	SP	e 35·2
La Paz		100·8	110	i 13 35	+10	i 23 45	[+ 5]	i 24 51	S	48·2
Columbia		101·3	57	—	—	e 23 45	[+ 3]	—	—	e 52·6
Bogota	E.	101·4	88	e 17 53	PP	e 23 45	[+ 2]	e 32 0	SS	—
La Plata	E.	101·9	131	19 23	pPP	23 23	[−22]	27 41	PPS	—
Resolute Bay		102·0	15	13 24	− 6	23 42	[− 4]	14 31	pP	—
Cleveland		102·3	49	e 17 49	PP	i 23 48	[+ 1]	e 24 55	S	—
Pittsburg		103·3	50	—	—	i 23 56	[+ 4]	—	—	—
Buffalo		104·5	48	i 18 6	PP	i 23 58	[+ 1]	—	—	—
Pennsylvania	N.	104·9	50	—	—	e 24 16	[+17]	i 25 20	S	—
Washington	Z.	105·3	53	i 18 14	PP	—	—	—	—	—
Colombo	N.	106·7	273	e 14 31	pP	(29 11?)	PPS	18 1	PP	29·2
Ottawa		107·0	46	e 17 58	PP	e 24 11	[+ 2]	e 27 19	SP	—
Fordham		107·9	51	i 18 32	PP	e 24 15	[+ 2]	—	—	—
Palisades		107·9	51	e 18 31	PP	i 24 15	[+ 2]	e 25 15	SKKS	—
Harvard		109·8	49	e 18 42	PP	e 24 29	[+ 8]	e 27 43	SP	e 42·9
Weston		110·0	49	e 18 44	PP	i 27 47	SP	i 29 5	PKKP	—
Hyderabad	N.	110·3	284	e 18 41	PP	26 6	S	e 27 53	SP	—
Seven Falls	E.	110·5	44	18 24	PP	24 23	[0]	25 19	SKKS	—
New Delhi	N.	113·0	295	—	—	e 24 29	[− 4]	e 25 34	SKKS	—
Almata		113·8	311	18 11	[− 1]	21 31	SKP	e 14 21	P	—
Rybach'e		114·4	310	e 18 14	[+ 1]	e 24 45	[+ 6]	e 25 54	SKKS	—
Naryn		114·5	308	e 18 13	[0]	e 24 38	[− 1]	—	—	—
Poona		114·6	284	i 18 13	[0]	i 26 49	S	i 28 38	PKKP	—
Frunse		115·5	310	e 18 16	[+ 1]	e 24 49	[+ 6]	e 19 16	pPKP	—
Bombay		115·8	284	18 11?	[− 5]	i 28 50	SP	i 31 57	?	—
Andijan		117·3	308	e 18 18	[− 1]	e 26 13	SKKS	e 19 24	pPKP	—
Fergana		117·7	308	e 18 19	[0]	e 24 55	[+ 4]	e 19 21	pPKP	—
Tchimkent		119·2	310	i 18 21	[− 1]	—	—	—	—	—
Kulyab		119·4	305	e 18 25	[+ 2]	—	—	—	—	—
Lunacharskoe		119·5	309	e 18 30	[+ 7]	e 25 3	[+ 6]	e 19 44	PP	—
Tashkent		119·6	309	i 18 22	[− 1]	e 24 56	[− 1]	i 19 26	pPKP	—
Ivigtut		120·5	27	i 19 55	PP	—	—	—	—	—
Samarkand		121·5	307	e 18 31	[+ 4]	—	—	—	—	—
Sverdlovsk		121·5	328	i 18 26	[− 1]	i 29 43	PS	i 19 31	pPKP	—
Scoresby Sund		122·4	10	e 18 28	[− 1]	i 25 16	[+ 9]	e 19 35	pPKP	—
Mary		125·7	306	i 18 35	[0]	i 22 3	PKS	19 41	pPKP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tananarive		126·3	232	e 20 29	PP	30 31	PS	23 22	PPP	64·2
Grahamstown	z.	127·5	202	i 18 39	[+ 1]	—	—	—	—	—
Ashkabad		128·4	307	i 18 41	[+ 1]	i 22 4	PKS	—	—	—
Pietermaritzburg	z.	129·2	208	i 18 42?	[0]	—	—	—	—	—
Pulkovo		132·1	343	e 18 47	[0]	e 25 16	[−18]	e 19 49	pPKP	—
Kimberley		132·3	203	i 18 41?	[− 7]	—	—	—	—	—
Moscow		132·8	336	i 18 48	[− 1]	e 27 40	SKKS	i 19 53	pPKP	—
Helsinki		133·1	347	i 18 49	[0]	e 25 43	[+ 7]	i 19 56	pPKP	e 53·2
Baku		134·1	312	i 18 56	[+ 5]	—	—	e 20 1	pPKP	—
Upsala		134·7	352	e 19 58	pPKP	i 25 46	[+ 7]	e 21 55	SKP	e 40·2
Makhach-Kala		134·8	316	i 18 52	[0]	—	—	i 19 59	pPKP	—
Shemakla		134·9	313	i 19 2	[+ 9]	i 22 13	PKS	i 20 7	pPKP	—
Bergen		135·1	0	e 19 14?	[+21]	—	—	e 20 5	pPKP	e 52·1
Lenkoran		135·4	310	i 18 55	[+ 2]	—	—	i 20 0	pPKP	—
Grozny		135·8	317	e 18 57	[+ 3]	—	—	—	—	—
Kirovobad		136·5	314	18 54	[− 1]	—	—	—	—	—
Aberdeen	E.	137·9	5	i 20 11	pPKP	—	—	—	—	e 58·2
Leninakan		138·2	316	e 19 1	[+ 3]	—	—	—	—	—
Copenhagen		139·4	354	i 18 57	[− 4]	22 21	SKP	20 9	pPKP	—
Sotchi		139·5	321	e 19 3	[+ 2]	—	—	—	—	—
Durham	N.	140·3	5	e 20 7	pPKP	i 28 37	SKKS	i 22 37	PKS	—
Rathfarnham Castle		141·1	11	i 19 6	[+ 2]	e 28 31	SKKS	i 20 7	pPKP	—
Yalta		142·1	326	19 0	[− 6]	i 22 13	SKP	i 20 6	pPKP	—
Lwow		142·5	340	i 19 1	[− 5]	—	—	e 20 4	pPKP	—
Potsdam	N.	142·6	352	e 21 28	?	e 22 37	PKS	—	—	—
Kishinev		142·9	334	19 3	[− 4]	i 22 25	SKP	i 20 7	pPKP	—
De Bilt		143·4	0	i 19 4	[− 4]	e 40 41	SS	i 20 10	pPKP	—
Collmberg	Z.	143·7	351	19 5	[− 3]	—	—	e 20 14	pPKP	—
Kew		143·7	5	i 19 6	[− 2]	e 28 15	SKKS	i 20 9	pPKP	e 54·2
Raciborzu	Z.	143·9	347	i 19 8	[− 1]	—	—	e 22 20	PP	—
Uzhgorod		144·1	340	e 19 7	[− 2]	i 22 30	SKP	e 20 9	pPKP	—
Jena		144·2	351	e 19 7	[− 2]	i 22 48	PKS	i 20 10	pPKP	—
Skalnate Pleso		144·2	344	19 11	[+ 2]	e 26 1	[+ 7]	e 20 11	pPKP	—
Prague		144·7	350	i 19 7	[− 3]	e 25 56	[+ 1]	i 20 14	pPKP	—
Sonneberg	N.	144·8	353	e 19 10	[0]	—	—	20 14	pPKP	—
Cheb		145·0	352	e 19 11	[0]	e 25 56	[0]	e 20 15	pPKP	—
Jersey	E.	145·7	8	e 19 11	[− 1]	—	—	—	—	57·2
Ogyalla		145·9	345	e 19 15	[+ 3]	e 20 47	sPKP	e 20 19	pPKP	—
Vienna		146·0	346	i 19 12	[0]	—	—	i 20 14	pPKP	—
Budapest		146·1	343	19 12	[0]	—	—	i 20 17	pPKP	—
Bucharest		146·2	332	e 19 15	[+ 2]	i 22 25	SKP	i 20 22	pPKP	—
Karlsruhe		146·4	357	i 19 15	[+ 2]	—	—	i 20 21	pPKP	—
Paris		146·6	3	e 19 14	[+ 1]	i 29 8	SKKS	i 20 19	pPKP	—
Stuttgart		146·6	355	i 19 13k	[0]	e 29 14	SKKS	e 20 17	pPKP	e 74·2
Strasbourg		146·8	357	e 19 14	[0]	e 29 17	SKKS	i 20 18	pPKP	e 56·2
Kalossa	E.	147·0	343	e 19 17	[+ 3]	e 22 55	PKS	i 20 23	pPKP	—
Ksara		147·0	308	i 19 14k	[0]	—	—	20 17	pPKP	—
Timisoara		147·0	339	i 19 20	[+ 6]	i 20 37	$pPKP_2$	—	—	—
Istanbul	Z.	147·2	327	e 19 16	[+ 2]	e 20 25	pPKP	—	—	—
Basle		147·9	357	e 19 15	[0]	e 29 17	SKKS	e 20 24	pPKP	—
Belgrade		148·0	339	e 19 19	[+ 3]	e 32 14	SKSP	i 20 28	pPKP	e 56·8
Zürich		148·0	356	e 19 15	[− 1]	e 29 13	SKKS	e 20 22	pPKP	—
Besançon		148·2	358	e 19 16	[0]	e 21 0	sPKP	e 20 23	pPKP	—
Chur		148·5	354	e 19 16k	[0]	—	—	e 20 24	pPKP	—
Neuchatel		148·5	357	e 19 17	[+ 1]	—	—	—	—	—
Sofia		148·5	334	e 19 21	[+ 5]	e 20 24	pPKP	—	—	—
Triest		149·0	349	i 19 17	[0]	i 26 7	[+ 6]	i 20 21	pPKP	—
Salo	z.	149·6	353	i 19 22k	[+ 4]	—	—	i 20 25	pPKP	—
Clermont-Ferrand		149·7	3	i 19 19	[+ 1]	e 29 29	SKKS	e 20 17	pPKP	—
Pavia		150·1	355	e 19 21a	[+ 2]	e 29 46	SKKS	e 20 28	pPKP	e 59·8
Padova		150·5	351	e 19 27	[+ 8]	—	—	20 21	pPKP	—
Bologna		150·6	352	e 19 23	[+ 4]	—	—	e 20 47	sPKP	—
Prato		151·2	351	e 19 21	[+ 1]	e 30 22	?	—	—	—
Florence		151·3	351	i 19 27k	[+ 7]	—	—	i 20 33	pPKP	—
Helwan	z.	152·2	305	i 19 22k	[0]	23 11	PKS	20 27	pPKP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Athens		152·3	327	e 19 20	[− 2]	—	—	e 20 20 pPKP	—
Rome		152·9	348	i 19 25	[+ 2]	e 29 46	SKKS	i 20 27 pPKP	—
Toledo		154·3	17	e 19 27	[+ 2]	—	—	i 19 50 PKP_2	—
Tortosa		154·3	8	19 28	[+ 3]	29 26	SKKS	24 31 pPP	—
Messina	z.	155·6	340	e 19 26	[0]	e 23 29	PKS	e 20 33 pPKP	—
Alicante		156·5	12	19 50	[+22]	—	—	20 24 PKP_2	e 66·4
Granada		156·9	19	19 27 a	[− 1]	26 9	[− 1]	20 0 pPKP	81·5
Malaga		157·0	20	i 19 28	[0]	i 21 1	sPKP	i 23 48 PP	58·6
Almeria		157·5	16	19 29	[0]	30 33	SKKS	23 45 PP	66·8
Algiers Univ.	z.	158·6	5	e 19 25	[− 5]	—	—	e 20 27 pPKP	—
Tamanrasset	z.	172·6	—	i 19 44 a	[+ 2]	e 31 53	SKKS	e 20 48 pPKP	81·2

Additional readings :—
Wellington iPPP? =6m.41s., e =10m.18s.
Christchurch isP =7m.8s., eNZ =7m.56s., eEN =10m.9s., esSN =12m.3s., isS?Z = 12m.8s., iZ =13m.38s. and 14m.4s.
Brisbane iPPZ =7m.32s., iE =8m.37s., isSE =12m.38s., iSSN =13m.42s.
Riverview iPPEZ =7m.59s., iE =9m.29s., iZ =9m.44s., iN =15m.22s. and 18m.35s.
Honolulu esP? =8m.31s.
Perth PP =13m.41s., i =22m.51s.
Tokyo iN =10m.32s., eE =14m.26s. and 20m.34s.
Berkeley epPPZ =14m.35s., eZ =20m.7s., epSEN =20m.53s., eEN =24m.5s., e = 30m.59s.
Lick iZ =13m.4s. and 14m.46s., ePKP,PKPZ =38m.40s.
Ukiah eSP =20m.54s.
Pasadena i =11m.11s., iPcPZ =11m.25s., isPE =12m.38s., iZ =13m.1s. and 13m.53s., iS =20m.16s., ePKP,PKPZ =38m.46s.
Fresno ePPN =13m.55s., eSKS?Z =21m.11s., eEN =21m.21s., ePKP,PKPZ =38m.36s.
Riverside ePKP,PKPZ =38m.45s.
China Lake isPZ =12m.49s., eZ =38m.38s., ePKP,PKPZ =38m.49s., eZ =39m.47s.
Mineral iE =11m.21s., iZ =11m.28s. and 11m.43s., eZ =37m.43s. and 39m.51s.
Tinemaha eZ =39m.53s.
Reno iZ =11m.24s., iE =11m.33s., eP′P′N =38m.20s., eZ =38m.28s.
Boulder City i =21m.30s., ePKKP =30m.52s., ePKP,PKP =38m.31s.
Overton ePKKPZ =30m.24s.
Pierce Ferry iPKKP =30m.53s.
Zi-ka-wei iZ =13m.5s., PPZ =15m.46s., PPPZ =17m.32s., iScSZ =21m.42s.
Tucson ePP =14m.48s., isS =21m.46s., eSS =25m.22s., ePKP,PKP =38m.43s.
Seattle iP? =11m.41s., iPcP =11m.47s., iPcP? =11m.50s., ipPcPE =12m.53s. and 13m.9s., isPcP =13m.19s., isPcP? =13m.33s., iPP =14m.26s., epPP =15m.20s., iScS =21m.38s., iPS =22m.14s., epS =22m.37s., and many unidentified readings.
Sitka ePP =15m.7s., isS =22m.38s., eSS =26m.35s.
Logan i =12m.12s. and 13m.22s., ePP =15m.6s., esPP? =16m.36s., esS =22m.52s., eSS =27m.6s., ePKKP =30m.12s., ePKP,PKP =38m.16s.
College i =12m.24s., ePP =15m.15s., i =22m.0s., iSP =22m.46s., eSS =27m.26s., ePKKP? =29m.41s., eSSS =30m.53s., ePKP,PKP =38m.16s.
Butte ePP? =15m.35s., eSP =22m.57s., eSS =27m.36s.
Hungry Horse iPP =15m.20s., epPP =16m.11s.
Bozeman ePP =15m.25s., eSP =23m.13s., eSS =27m.43s., eSSS? =30m.53s.
Rapid City isSE =23m.55s., eSSE =28m.41s.
Lincoln ePPE =16m.26s., eSPE =24m.36s., eSSE =29m.56s.
St. Louis iSP =25m.15s.
Huancayo esP? =14m.49s., e =18m.22s., eS =24m.7s., iPS =25m.19s., e =25m.26s. and 30m.12s., i =30m.41s., eSSS =34m.23s.
Chicago eSP =25m.31s., eSS? =30m.12s.
Chinchina ePP?Z =15m.52s.
La Paz PP =17m.49s., i =25m.36s., iPS =26m.51s., iPPS =27m.45s., iSS =32m.3s.
Bogota eE =19m.6s.
La Plata PSE =24m.47s., PPSE =25m.23s., E =26m.11s.
Resolute Bay eZ =17m.13s., PP =17m.44s., SKKS =24m.26s., S =24m.54s., e =25m.42s., SSS =36m.5s.
Cleveland iSKS?E =23m.54s
Pennsylvania isS?N =27m.22s., iSSN =32m.46s.
Ottawa e =18m.24s., ScS =28m.3s., e =33m.23s.
Palisades iPS =27m.27s., eSS =33m.33s.
Harvard eSPP =28m.57s., eSS =33m.56s.
Seven Falls PSE =27m.54s., PPSE =29m.4s., SSE =34m.4s.
New Delhi iSKKSN =26m.29s., iN =28m.17s., ePPS?N =30m.21s., eN =34m.14s., iN = 36m.10s.
Almata pP =15m.25s., PP =19m.3s.?.
Frunse ePKS =21m.41s., eSKSP =28m.55s.
Tashkent iPP =19m.46s., ePPP =20m.44s., iSKKS =26m.19s.
Scoresby Sund e =20m.3s., 26m.43s., 28m.8s., 29m.46s., 31m.17s., 32m.3s., 35m.29s., 37m.11s., and 39m.35s.

Continued on next page.

Mary ePP =20m.28s., ipPP =21m.29s.
Tananarive e =37m.34s.
Pulkovo iPKS =22m.14s., ipPKS =23m.16s.
Moscow ePP =21m.12s.
Helsinki ePPZ =21m.53s., iSKPN =21m.59s., iSPPEN =23m.18s., ePPSEN =23m.48s., eSKKSN =27m.40s.
Upsala epPKPE =20m.2s., eN =21m.19s., iPKS =22m.21s., ipPKS =23m.22s., i =27m.58s., eN =29m.42s., eSP? =31m.29s., epPSN =32m.48s., eSS =38m.53s.
Aberdeen iE =24m.2s., iPPPE =26m.21s., eE =35m.8s.
Copenhagen i =19m.1s., PP =21m.58s., PKS =22m.39s., pPP =23m.41s., SS =39m.53s.
Durham iN =23m.44s.
Rathfarnham Castle ePPZ =22m.21s., epPPEN =23m.17s., eSSEN =40m.41s.
Yalta iPPP =25m.2s.
Potsdam eN =22m.47s. and 23m.51s.
De Bilt iPP =22m.32s.
Collmberg iPKP$_2$EZ =19m.11s., E =21m.24s., ePPZ =22m.31s., eZ =23m.5s., epPPE =23m.11s., eE =25m.1s., eZ =25m.29s., epPPPZ =26m.52s., eZ =30m.35s. and 33m.48s.
Kew iPPZ =22m.26s., epPPZ =23m.18s., esPPNZ =23m.51s., eEN =28m.50s., eSKSP =32m.19s., eSSEN =40m.45s.
Raciborzu iZ =19m.13s. and 19m.17s., eEZ =20m.20s., eZ =21m.17s. and 21m.32s., eE =24m.22s.
Jena ePKPE =19m.10s., iPKP$_2$E =19m.17s., iE =19m.22s., epPKP$_2$?E =20m.20s., eE =21m.14s., ePPN =22m.25s., ipPPE =23m.5s., eE =24m.34s.
Skalnate Pleso esPKP =20m.33s., ePP =22m.35s., epPP? =23m.55s., esPP? =24m.30s., eSKSP =31m.53s., eSPP =34m.47s., eSS =40m.56s. and other unidentified e readings
Prague ePKP$_2$E =19m.19s., esPKP =20m.41s., ePPZ =22m.41s., epPP =23m.54s., esPP =24m.27s., ipSKS =27m.30s., esSKS =27m.57s., eSKKS =28m.25s., eSKSP =32m.11s., eSS =41m.11s. and numerous unidentified readings.
Sonneberg pPKP =20m.24s., eN =20m.31s.
Cheb esPKP? =20m.35s., ePP =22m.43s., epPP =23m.55s., eSPP =34m.37s., and other unidentified e readings.
Ogyalla ePKP =19m.19s., ePP =22m.53s., epPP =23m.52s., esPP =24m.27s., and other unidentified e readings.
Vienna ePKP$_2$ =19m.25s., ePP? =22m.22s., epPP =23m.51s.
Budapest iN =19m.31s. and 20m.23s., iE =20m.30s., eE =39m.41s.
Bucharest iN =21m.31s., iE =22m.42s.
Paris iPKP$_2$ =19m.23s., ipPKP$_2$ =20m.29s., isPKP$_2$ =20m.51s., iSKP =22m.33s., iPP =22m.43s., iPKS =22m.57s., ipPP =23m.37s., isPP =24m.3s.?, ePPP =26m.23s. isSKS =28m.8s., iSKSP =32m.8s., iPSKS =32m.37s., iPS =33m.25s., iSPP =34m.54s., iPPS =35m.18s., iSS =41m.19s., iSSP =42m.4s., iPSS =42m.40s., eSSS =47m.20s., and other unidentified i readings.
Stuttgart iPKPZ =19m.19s., isPKP =20m.51s., ePP =22m.37s., eSS? =43m.5s., eSSS? =47m.11s. and other unidentified readings.
Strasbourg i =19m.17s., isPKP? =20m.38s., isPKP =21m.46s., ePP =22m.33s., epPP =23m.36s., esPP? =24m.24s., e =25m.48s., ePPP =26m.35s., e =30m.40s. and 33m.23s., eSPP =35m.5s., eSS =41m.42s., e =49m.11s., and 53m.23s.
Kalossa iN =19m.26s., 20m.26s., and 21m.43s., eN =22m.21s., iE =23m.38s.
Ksara PP =22m.42s.
Timisoara iP*?N =19m.38s., eP$_g$?E =19m.56s.
Istanbul eZ =19m.19s., eN =21m.4s.
Belgrade iZ =19m.23s., eNE =22m.37s., ePPPNW =25m.8s., eNE =38m.17s. and 43m.16s.
Zürich e =19m.19s.
Besançon eSKP =22m.27s., ePP? =22m.37s., epPP =23m.52s., ePPP =26m.12s. and other unidentified readings.
Triest iPKP$_2$Z =19m.44s., ePP?Z =22m.34s., epPPZ =23m.30s., e =27m.10s., iSKKS =29m.21s.?, iSKKP? =40m.42s.
Clermont-Ferrand esPKP =20m.54s., ipPP =24m.5s., isPP =24m.26s., eSS =41m.53s. and other unidentified readings.
Pavia eE =19m.29s., i =20m.52s., ePSKS =33m.17s., e =35m.32s., eSS =42m.15s., eSSS =48m.24s.
Padova e =20m.39s. and 21m.19s.
Florence e =20m.28s.
Helwan eZ =20m.0s., iZ =24m.17s.
Athens i =19m.30s., e =20m.30s.
Rome i =23m.24s. and 25m.0s.
Toledo i =20m.42s. and 21m.2s., ePP? =23m.21s., e =25m.18s.
Alicante PP =23m.34s., PPP =26m.54s., PPS =35m.44s., SS =41m.25s., SSS =46m.50s., Q =60m.46s.
Granada sPKP =21m.3s., iPP =23m.48s., pPP =24m.39s., SKKS =30m.9s., SKSP =34m.43s., iSS =43m.27s.
Malaga Q =53m.26s.
Almeria PPP =27m.29s., SS =43m.49s.
Algiers Univ. iPKP$_2$Z =20m.7s., epPKP$_2$Z =21m.11s., ePPZ =23m.48s., eZ =24m.35s.
Tamanrasset iPKP$_2$Z =21m.11s., ipPKP$_2$Z =22m.13s., ePPZ =24m.56s., epPPZ =26m.0s., ePPPZ =28m.56s., eZ =30m.11s., eSKSPZ =34m.41s.

Feb. 13d. 16h. 28m. 2s. Epicemtre 14°·5N. 90°·5W. (as at 8h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca		6·5	293	i 1 29	−10	i 2 51	− 4	—	—	3·3
Vera Cruz		7·1	312	—	—	e 3 22	+12	—	—	—
Tacubaya		9·6	302	e 2 20	− 1	—	—	—	—	e 5·0
St. Louis		24·0	1	i 5 20	+ 3	e 9 49	+17	—	—	—
Tucson		25·6	318	e 5 35	+ 3	e 10 8	+ 9	e 6 23	PPP	e 13·6
Cleveland	N.	28·0	14	e 6 43	PP	—	—	—	—	—
Fort de France		28·4	86	—	—	e 11 7	+22	—	—	—
Palomar	Z.	30·4	314	e 6 19	+ 3	—	—	—	—	—
Boulder City		30·5	320	e 6 20	+ 3	—	—	—	—	—
Overton	Z.	30·6	321	e 6 21	+ 3	—	—	—	—	—
China Lake	Z.	32·2	318	e 6 34	+ 2	—	—	—	—	—
Harvard		32·3	28	i 6 32	− 1	—	—	—	—	—
Tinemaha	Z.	33·4	318	e 6 46	+ 4	—	—	—	—	—
Lick	Z.	35·8	316	i 6 30k	−33	—	—	—	—	—
Reno	Z.	35·8	321	e 8 45	PPP	—	—	—	—	—
Seven Falls	E.	36·4	23	—	—	e 13 0	+10	—	—	15·9
Mineral	Z.	37·4	320	e 7 27k	+11	—	—	e 8 7	?	—
La Paz		37·9	143	e 7 12	− 8	12 40	−33	—	—	19·0
Hungry Horse		38·9	336	e 7 30	+ 1	—	—	—	—	—
Victoria	Z.	43·4	329	e 8 17	+11	—	—	—	—	—
Resolute Bay		60·2	359	10 11	− 1	—	—	—	—	e 31·3
College		63·4	337	10 33	− 1	—	—	e 11 10	PcP	e 36·3
Granada		79·0	55	e 12 56a	+49	24 11	?	—	—	37·6
Collmberg	Z.	87·0	38	e 12 47	− 1	—	—	—	—	—

Long waves were also recorded at Berkeley, Scoresby Sund, and Almeria.

Feb. 13d. 22h. 12m. 55s. Epicentre 56°·0N. 156°·2W.

A = −·5140, B = −·2267, C = +·8273; δ = +1; h = −8;
D = −·404, E = +·915; G = −·757, H = −·334, K = −·562.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		9·8	21	e 2 25	+ 1	—	—	—	—	i 4·9
Sitka		11·5	76	e 2 47	− 1	e 4 57	− 2	—	—	i 5·2
Adak		12·7	260	i 3 13	+ 8	e 5 29	+ 1	—	—	—
Victoria		21·3	95	i 4 48k	− 2	8 52	+ 9	i 4 55	P	10·3
Seattle		22·4	96	i 5 4k	+ 2	i 9 14	+10	i 5 30	PP	e 10·1
Klyuchi		23·7	290	i 5 13	− 1	i 9 31	+ 4	i 5 45	PP	—
Arcata		25·8	112	e 5 37a	+ 3	e 9 43	−19	—	—	e 12·1
Hungry Horse		26·6	87	i 5 42	0	e 10 18	+ 2	—	—	e 14·1
Shasta Dam		26·8	109	i 5 42	− 2	i 11 11	SS	—	—	i 12·7
Mineral		27·5	109	e 5 49a	− 1	e 10 42	+12	i 6 35	PP	e 13·5
Ukiah		27·6	112	e 5 50	− 1	e 10 23	− 9	e 6 51	PPP	i 12·8
Butte		28·8	90	e 6 5	+ 3	i 10 57	+ 6	e 6 55	PP	i 12·5
Saskatoon		28·8	76	6 5	+ 3	11 0	+ 9	—	—	13·1
Berkeley		29·0	113	e 6 0k	− 4	i 10 56	+ 2	e 6 8	P	i 13·7
Reno	Z.	29·1	107	i 6 3k	− 1	—	—	e 6 51	PP	e 14·0
Resolute Bay	Z.	29·6	27	6 10	+ 1	e 12 27	SS	e 16 26	ScS	e 15·9
Santa Clata		29·6	113	e 6 9	0	e 11 13	+ 9	—	—	e 13·6
Lick		29·7	113	i 6 9k	− 1	e 11 22	+16	—	—	e 14·2
Bozeman		29·8	89	e 6 14	+ 3	e 11 6	− 1	i 7 14	PP	e 12·8
Fresno		31·2	111	e 6 20k	− 3	—	—	—	—	e 14·1
Tinemaha		31·7	110	i 6 27k	0	—	—	i 7 7	?	—
Logan		31·9	96	i 6 30	+ 1	e 11 39	− 1	i 8 59	PcP	i 13·6
Salt Lake City		32·5	97	i 6 34	0	i 11 52	+ 3	i 7 37	PP	i 13·9
China Lake		33·0	110	i 6 36k	− 3	e 12 3	+ 6	i 13 2	ScP	—
Pasadena		34·0	112	e 6 45	− 3	i 12 15	+ 2	e 13 5	ScP	i 14·3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Overton	Z.	34·1	106	i 6 49	+ 1	e 17 22	ScS	—	—	—
Boulder City		34·3	107	i 6 41	− 9	e 12 23	+ 6	—	—	—
Riverside		34·5	112	i 6 51k	− 1	—	—	—	—	—
Honolulu		34·7	182	e 6 52	− 2	i 12 19	− 5	e 8 8	PP	i 14·5
Pierce Ferry		34·7	106	i 6 52	− 2	i 12 31	+ 7	—	—	e 18·4
Rapid City	E.	35·2	86	e 7 1	+ 3	i 12 33	+ 2	e 9 23	PcP	e 15·3
Palomar		35·3	112	i 6 56k	− 3	—	—	—	—	—
Yuzno-Sakhlinsk		37·9	285	7 22	+ 2	13 15	+ 2	—	—	—
Nemuro		38·6	278	i 7 23	− 3	i 13 16	− 7	—	—	e 18·7
Tucson		39·3	107	e 7 31	− 1	e 13 17	−17	e 9 13	PcP	i 16·4
Lincoln	E.	41·0	85	e 7 48	+ 2	e 13 55	− 4	e 9 35	PP	e 17·2
Sapporo		41·1	281	e 7 48	+ 1	e 13 58	− 3	e 18 12	Q	e 22·7
Hatinohe		42·7	277	7 41	−19	14 19	− 5	—	—	21·5
Morioka		43·5	277	i 8 6	− 1	i 14 32	− 4	—	—	e 18·1
Mizusawa		43·9	276	8 9	− 1	14 38	− 4	—	—	e 20·5
Akita		44·1	277	8 9	− 3	14 42	− 3	—	—	e 20·8
Sendai		44·6	275	8 14	− 2	e 14 48	− 4	—	—	e 19·3
Hukusima		45·2	276	8 17	− 3	i 14 57	− 4	—	—	18·5
Chicago		45·4	77	e 8 23	+ 1	i 14 57	− 7	e 9 16	?	i 18·3
St. Louis		46·1	83	i 8 30	+ 2	i 15 14	0	i 8 44	pP	—
Aikawa		46·3	277	e 8 25	− 4	15 12	− 4	—	—	21·0
Vladivostok		46·3	287	i 8 26	− 3	—	—	—	—	—
Tukubasan		46·5	274	8 28	− 3	15 18	− 1	—	—	22·0
Tokyo		47·1	274	i 8 33	− 2	i 15 28	0	i 10 27	PP	22·7
Matusiro		47·4	275	8 35	− 3	15 31	− 1	i 10 31	PP	22·2
Mera		47·6	273	e 8 45	+ 6	e 15 37	+ 2	—	—	e 21·4
Hunatu		47·8	274	8 38	− 3	15 44	+ 6	—	—	21·4
Shizuoka		48·4	273	e 8 44	− 2	i 15 45	− 1	10 48	PP	20·3
Cincinnati		48·9	78	i 8 50	0	i 15 51	− 2	i 18 40	ScS	—
Cleveland		48·9	74	e 8 48a	− 2	i 15 51	− 2	i 18 39	ScS	—
Buffalo		49·3	70	i 8 52	− 1	e 15 58	− 1	e 18 47	ScS	—
Ottawa		49·3	66	i 8 51	− 2	e 15 47	−12	i 18 42	ScS	i 26·1
Kameyama		49·6	274	8 57	+ 2	15 44	−19	—	—	22·1
Scoresby Sund		49·7	19	e 8 56	0	i 16 10	+ 6	18 49	ScS	24·1
Shawinigan Falls N.		50·0	63	8 56	− 2	e 16 8	− 1	18 47	ScS	23·9
Ivigtut		50·2	37	e 8 59	− 1	i 16 12	+ 1	i 18 51	ScS	24·9
Osaka		50·2	276	i 9 2	+ 2	i 16 13	+ 2	—	—	22·9
Kobe		50·4	276	e 9 0	− 1	e 16 14	0	e 11 0	PP	e 24·8
New Kensington	E.	50·5	73	i 9 4	+ 2	i 16 18	+ 2	i 18 52	ScS	e 21·3
Pittsburgh		50·5	73	i 9 3	+ 1	i 16 17	+ 1	i 18 53	ScS	—
Seven Falls	E.	50·6	61	9 1	− 1	16 16	− 1	18 51	ScS	24·1
Sumoto		50·8	276	9 5	+ 1	i 16 18	− 2	—	—	23·2
Hamada		52·0	278	9 10	− 3	16 33	− 3	—	—	24·4
Koti		52·2	276	e 9 13	− 2	e 16 34	− 5	e 9 54	pP	—
Matuyama		52·4	277	e 9 12	− 4	i 16 39	− 3	i 18 48	ScS	e 23·7
Guadalajara		52·6	109	e 9 16	− 2	e 16 41	− 3	e 19 3	ScS	—
Washington	Z.	53·1	72	e 9 21	0	e 16 54	+ 3	—	—	i 26·0
Palisades		53·3	69	i 9 22	− 1	i 16 58	+ 4	i 19 7	ScS	e 28·2
Fordham		53·4	69	i 9 26	+ 2	i 17 2	+ 7	—	—	—
Harvard		53·4	66	i 9 23	− 1	i 16 58	+ 3	i 19 12	ScS	e 22·1
Irkutsk		53·4	312	e 9 20	− 4	—	—	—	—	—
Weston		53·6	66	i 9 24	− 1	e 16 57	− 1	—	—	—
Hukuoka		53·9	279	i 9 27	0	17 19	PPS	23 10	Q	25·4
Columbia		54·6	80	i 9 33	+ 1	i 17 5	− 6	i 19 18	ScS	e 21·8
Miyazaki		54·6	276	9 28	− 4	17 13	+ 2	—	—	21·3
Reykjavik		55·2	23	i 9 39	+ 2	e 17 35	PPS	i 11 44	PP	e 25·3
Kagosima		55·3	277	e 9 34	− 4	17 23	+ 2	—	—	25·4
Tacubaya		55·8	106	e 9 42	+ 1	e 17 28	0	—	—	—
Halifax		55·9	59	9 46	+ 4	17 30	+ 1	19 32	ScS	27·0
Puebla		56·6	106	e 9 47	0	e 17 33	− 5	e 11 50	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vera Cruz		57·6	103	e 9 51	− 3	e 17 43	− 8	e 13 9	PPP	—
Oaxaca		59·1	105	—	—	e 17 58	−13	e 21 47	SS	—
Merida		59·8	96	e 10 9	0	e 18 14	− 6	—	—	—
Zi-ka-wei	z.	60·6	283	10 14	− 1	18 35	+ 5	12 29	PP	27·6
Nanking		61·4	287	10 16	− 4	i 18 39	− 1	19 57	ScS	—
Guam		61·8	252	10 27	+ 4	18 45	− 1	—	—	—
Bergen		63·0	10	i 10 37	+ 6	i 19 0	− 1	e 20 30	ScS	27·1
Sverdlovsk		63·6	339	i 10 33	− 2	i 19 9	+ 1	—	—	—
Semipalatinsk		64·1	324	e 10 36?	− 2	e 19 13?	− 1	—	—	—
Helsinki		64·2	0	e 10 39	0	i 19 18	+ 2	e 20 27	ScS	e 31·1
Upsala		64·4	4	i 10 38a	− 2	i 19 14	− 4	i 20 30	ScS	e 27·1
Pulkovo		64·5	357	i 10 41	0	i 19 22	+ 3	—	—	—
Aberdeen	E.	65·3	16	i 10 47	+ 1	i 19 32	+ 3	i 13 10	PP	31·7
Edinburgh	E.	66·3	17	10 53	+ 1	19 44	+ 2	20 47	ScS	—
Durham		67·7	16	i 11 5	+ 4	i 20 2	+ 4	i 13 36	PP	—
Moscow		68·1	353	e 11 1	− 3	e 20 3	0	—	—	—
Copenhagen		68·3	7	i 11 4	− 1	i 20 11	+ 5	i 21 5	ScS	—
Lund		68·3	7	11 7	+ 2	20 8	+ 2	—	—	—
Rathfarnham Castle		68·3	19	i 11 7	+ 2	i 20 17	+11	e 13 49	PP	e 31·0
Chilisk		70·6	321	i 11 15	− 4	—	—	—	—	—
Apia		70·8	196	e 11 29?	+ 9	e 20 31	− 4	e 11 53	PcP	—
Ili		70·8	323	i 11 17	− 3	—	—	—	—	—
Kew		71·1	16	i 11 22a	0	i 20 45	+ 7	i 14 2	PP	e 32·1
Kurmenty		71·1	321	i 11 21?	− 1	—	—	—	—	—
De Bilt		71·2	12	i 11 26a	+ 3	i 20 46	+ 6	e 13 57	PP	e 34·1
Almata		71·4	323	i 11 21	− 3	e 20 38	− 4	—	—	—
Potsdam		71·6	7	i 11 27	+ 2	i 20 51	+ 7	e 14 8	PP	e 32·1
Rybach'e		72·4	323	i 11 29	− 1	—	—	—	—	—
Frunse		72·5	324	e 11 29	− 1	e 20 54	0	—	—	—
Collmberg		72·7	7	e 11 30	− 2	e 21 2	+ 5	e 16 8	PPP	e 31·1
Jena		73·0	8	e 11 32	− 1	e 21 4	+ 4	e 14 19	PP	e 35·6
Jersey	E.	73·0	17	e 11 32	− 1	e 21 5?	+ 5	—	—	35·1
Naryn		73·4	322	11 36	0	e 21 9	+ 4	—	—	—
Sonneberg		73·5	8	e 11 36	0	i 21 11	+ 5	e 14 22	PP	e 36·1
Cheb		73·9	8	e 11 41	+ 2	i 21 15	+ 5	e 14 29	PP	e 30·1
Prague		74·0	7	i 11 40	+ 1	i 21 17	+ 6	e 14 39	PP	e 31·1
Paris		74·1	16	i 11 39	− 1	i 21 17	+ 5	i 14 22	PP	e 34·1
Raciborzu		74·2	5	e 11 40	0	e 21 17	+ 3	e 14 23	PP	e 35·1
Lwow		74·5	0	e 11 40	− 2	i 21 19	+ 2	—	—	—
Karlsruhe		74·6	12	i 11 44	+ 1	i 21 25	+ 7	—	—	e 37·1
Tchimkent		74·7	327	i 11 42	− 1	e 21 17	− 2	—	—	—
Strasbourg		74·9	12	e 11 45	+ 1	e 21 24	+ 2	i 14 36	PP	e 35·6
Stuttgart		74·9	11	e 11 43	− 1	i 21 26	+ 4	e 14 34	PP	e 36·1
San Juan		75·0	79	e 11 43	− 2	—	—	e 14 47	PP	e 45·3
Skalnate Pleso		75·1	3	e 11 47	+ 1	21 30	+ 6	e 14 32	PP	e 32·6
Andijan		75·2	325	e 11 49	+ 3	i 21 29	+ 4	—	—	—
Balboa Heights		75·2	96	e 12 1	PcP	e 21 55	ScS	—	—	—
Lunacharskoe		75·6	327	i 11 50	+ 2	21 35	+ 6	—	—	—
Fergana		75·7	325	e 11 51	+ 2	e 21 33	+ 3	—	—	—
Tashkent		75·7	327	i 11 48	− 1	i 21 36	+ 6	—	—	—
Uzhgorod		75·7	2	i 11 48	− 1	21 33	+ 3	—	—	—
Basle		75·9	11	e 11 50	0	e 21 39	+ 7	e 14 43	PP	—
Vienna		75·9	6	i 11 50	0	e 21 43	+11	e 15 2	PP	—
Besançon		76·0	13	i 11 51	0	e 21 28	− 6	e 14 52	PP	—
Cernauti		76·1	358	i 11 51	0	21 43	+ 8	—	—	—
Galerazamba		76·1	91	i 12 26	+35	i 22 13?	+38	—	—	—
Zürich		76·2	11	e 11 52k	0	e 21 41	+ 5	e 14 40	PP	—
Neuchatel		76·4	12	e 11 53	0	e 21 43	+ 5	—	—	—
Ogyalla		76·4	5	e 11 58	+ 5	e 21 47	+ 9	e 14 51	PP	e 35·1
Budapest		76·8	5	11 56	+ 1	i 21 48	+ 6	14 54	PP	34·6

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chur		76·8	10	e 11 55	0	e 21 48	+ 6	e 14 46	PP	e 38·4
Clermont-Ferrand		77·1	15	i 11 55	− 2	i 21 51	+ 5	i 14 55	PP	e 32·5
Kishinev		77·3	357	11 58	0	—	—	—	—	—
Kalossa		77·8	5	12 5	+ 4	21 57	+ 4	15 15	PP	—
Samarkand		77·9	328	e 12 2?	+ 1	i 21 53?	− 1	—	—	—
Salo	z.	78·2	11	e 12 4k	+ 1	e 22 5	+ 8	e 15 6	PP	—
Khorog		78·4	323	12 4	0	22 3	+ 3	—	—	—
Pavia		78·4	12	e 12 6a	+ 2	e 23 48	PPS	i 15 7	PP	e 36·8
Triest		78·4	8	i 11 24a	−40	i 22 5	+ 5	i 15 5	PP	—
Kulyab		78·6	325	i 12 5	0	—	—	—	—	—
Timisoara		78·6	2	e 12 10	+ 5	22 10	+ 8	i 15 11	PP	e 42·6
Theodosia		78·9	353	e 12 7	0	22 9	+ 4	—	—	—
Piatigorsk		79·0	347	12 9	+ 2	22 10	+ 4	—	—	—
Bologna		79·3	11	e 12 11	+ 2	e 22 16	+ 7	—	—	e 39·8
Grozny		79·3	344	i 12 11	+ 2	i 22 13	+ 4	—	—	—
Makhach-Kala		79·4	343	i 12 9	0	i 22 13	+ 3	—	—	—
Padova		79·4	10	i 12 10	+ 1	e 22 16	+ 6	15 10	PP	40·6
Belgrade		79·5	3	e 12 9a	− 1	i 22 17	+ 6	e 15 21	PP	e 38·6
Yalta		79·5	353	12 10	0	22 14	+ 3	—	—	—
Bucharest		79·9	359	i 12 17	+ 5	i 22 20	+ 4	e 15 18	PP	38·1
Prato		79·9	10	i 12 12	0	—	—	i 12 23	pP	—
Sotchi		79·9	349	i 12 9	− 3	i 22 14	− 2	—	—	—
Florence		80·0	10	e 12 12	− 1	22 41	+24	15 16	PP	—
Chinchina		80·6	95	e 12 20	+ 4	i 22 25	+ 2	e 15 40	PP	e 35·1
Fort de France		80·7	77	i 12 16	0	i 22 36	+12	—	—	—
Zugdidi		80·7	348	e 12 18	+ 2	e 22 27	+ 3	—	—	—
Tiflis		81·0	345	e 12 19	+ 1	e 22 30	+ 3	—	—	—
Borzhomi		81·1	347	e 12 20	+ 2	i 22 34	+ 6	—	—	—
Barcelona		81·2	17	i 12 25	+ 6	i 22 32	+ 3	—	—	e 37·6
Abastumanj		81·3	347	e 12 19?	− 1	e 22 36?	+ 6	—	—	—
Mary		81·3	330	12 19	− 1	e 22 39	+ 9	15 27	PP	—
Baku		81·5	341	i 12 23	+ 2	i 22 41?	+ 9	—	—	—
Tortosa		81·5	18	i 12 22	+ 1	i 22 35	+ 3	15 31	PP	34·4
Chatra		81·6	306	12 19	− 2	e 22 34	+ 1	15 26	PP	—
Lisbon		81·6	26	12 20	− 1	i 22 34	+ 1	i 27 47	SS	33·1
Toledo		81·6	22	i 12 26	+ 5	i 22 42	+ 9	17 33	PPP	35·9
Kirovobad		81·7	344	12 30	+ 8	—	—	—	—	—
Sofia		81·7	0	12 24	+ 2	i 22 36	+ 2	—	—	e 40·1
Bogota		81·8	93	e 12 28	+ 6	i 22 30	− 5	i 27 51	SS	e 36·7
Ashkabad		81·9	333	i 12 22	− 1	—	—	—	—	—
Rome		82·0	9	i 12 25	+ 2	i 22 42	+ 5	i 15 34	PP	—
Leninakan		82·1	345	e 12 27	+ 3	—	—	—	—	—
Rocca di Papa		82·2	9	e 12 27	+ 3	e 22 40	+ 1	e 15 36	PP	—
Dehra Dun	N.	82·4	315	e 17 5	PPP	e 24 38	?	e 33 59	Q	e 46·2
Erevan		82·6	345	e 12 31	+ 5	—	—	—	—	—
Istanbul		83·2	357	e 12 30	+ 1	e 22 55	+ 6	—	—	e 41·1
Lenkoran		83·2	341	i 12 29	0	i 22 52	+ 3	—	—	—
Nakhichevan		83·4	343	12 30	0	i 22 54	+ 3	—	—	—
Taranto		83·7	6	e 11 55	−37	e 23 1	+ 7	—	—	33·8
Alicante		83·8	19	i 12 38	+ 6	i 22 59	+ 4	15 54	PP	e 38·6
Granada		84·3	22	i 12 39a	+ 4	i 23 9	+ 9	13 17	pP	i 39·4
New Delhi		84·3	315	i 12 34	− 1	i 22 54	− 6	17 42	PPP	—
Malaga		84·6	23	i 12 35	− 1	i 23 13	+10	i 15 47	PP	44·7
Calcutta	E.	84·7	303	i 12 41	+ 4	i 23 3	− 1	15 55	PP	39·6
Almeria		84·8	21	i 12 39	+ 2	i 23 9	+ 4	i 15 45	PP	38·5
Algiers Univ.	z.	85·9	17	i 12 43a	0	e 23 20	+ 4	e 16 6	PP	—
Messina		85·9	8	e 12 42	− 1	e 23 5	[− 2]	e 15 45	PP	e 50·9
Athens		86·4	0	e 12 47a	+ 2	—	—	—	—	—
Ksara		89·9	350	13 4?	+ 2	23 40?	[+ 8]	—	—	—
Brisbane		93·7	224	e 13 17	− 3	e 23 54	[0]	e 24 29	S	—

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		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Hyderabad	N.	93·7	309	i 13 21	+ 1	23 50	[− 4]	17 7	PP		43·4
Helwan		94·2	354	i 13 23a	+ 1	23 57	[0]	24 29	S		—
Poona		94·6	313	i 13 12	−12	e 24 34	− 1	23 53	SKS		—
Bombay		94·7	314	e 13 25	+ 1	i 23 59	[0]	i 24 41	S		45·2
Huancayo		94·8	104	e 13 27	+ 2	e 24 34	− 2	e 23 53	SKS		e 39·2
Djakarta		99·0	273	e 13 45	+ 1	e 25 27	+15	—	—		—
Bandong		99·1	271	—	—	e 25 30	+17	—	—		—
Tamanrasset	Z.	100·0	17	e 13 48k	0	e 24 44	[+17]	e 17 53	PP		48·1
Wellington		100·0	203	—	—	e 24 13	[−14]	—	—		47·1
Riverview		100·1	223	e 13 51	+ 2	i 24 26	[− 1]	i 25 27	S		e 46·4
Kodaikanal	E.	100·5	307	e 13 50	− 1	25 25	0	i 24 28	SKS		48·2
Colombo	N.	102·3	302	13 55	− 4	24 38	[0]	—	—		52·4
La Paz		102·4	100	e 14 10	+11	i 25 17	{+ 5}	i 25 1	SKS		46·4
Christchurch		102·6	203	14 10	+10	25 41	− 1	24 31	SKS		47·1
Perth		114·8	250	—	—	i 27 25	S	i 31 48	?		54·0
La Plata		122·5	105	(15 23)	P	—	—	(20 53)	PP		—
Tananarive		138·9	325	e 18 30	[−59]	26 34	[− 3]	22 22	PP		66·1
Kimberley		152·8	358	i 19 15?	[−36]	—	—	—	—		—
Pietermaritzburg	z.	153·2	347	e 19 55	[+ 3]	—	—	—	—		—
Grahamstown	z.	157·2	353	i 20 0	[+ 3]	—	—	—	—		—

Additional readings and note :—
Sitka iP =2m.50s., iS =5m.3s.
Seattle iPcP =8m.14s. and other i readings without phase.
Klyuchi ePPP =5m.58s.
Arcata eZ =5m.51s., eScSN =15m.25s.
Mineral eQN =12·1m.
Reno eE =6m.22s. and 7m.37s.
Lick iZ =6m.18s.
Bozeman iS =11m.10s.
Fresno eN =6m.58s., ePcP?Z =8m.40s.
Logan iS =11m.47s.
Salt Lake City i =12m.53s.
China Lake iZ =7m.12s. and 13m.18s.
Pasadena iPPZ =8m.8s., iPcPZ =9m.16s., eScSN =17m.9s.
Honolulu iP =6m.55s., i =7m.50s., 8m.55s., and 13m.31s.
Rapid City iPPE =8m.35s., iE =9m.5s.
Tucson i =8m.3s., iPP =8m.20s.
Sapporo i =8m.0s.
St. Louis i =9m.2s., e =9m.16s., ePcP =10m.5s., i =10m.36s. and 10m.43s., iPPP = 10m.56s., iSS =18m.19s.
Tokyo iE =8m.40s., e =15m.18s., iZ =15m.47s., i =16m.19s., eE =18m.33s.
Matusiro i =15m.54s., sS =18m.19s.
Shizuoka SS? =19m.23s.
Cincinnati iScS =18m.57s.
Cleveland ePEN =8m.51s., iZ =9m.11s. and 9m.15s., iE =9m.52s., iEN =10m.52s. and 11m.12s., iN =16m.57s., iE =18m.1s.
Buffalo i =9m.39s., iPcP =10m.22s.
Ottawa eSS =19m.18s., iSSS =19m.47s., e =21m.5s.
Scoresby Sund i =10m.43s., 10m.55s., and 12m.36s. ; 22m.31s.
Shawinigan Falls PPN =10m.51s., eN =13m.25s., SN =15m.54s.
Ivigtut i =9m.2s., 11m.1s., SS =19m.46s.
New Kensington ePPE =11m.4s., eSSE =20m.0s.
Seven Falls PPE =11m.4s., SSE =20m.8s.
Koti ePP =11m.22s., eScP? =13m.32s., eSS =20m.27s., eSSS =23m.7s.
Matuyama i =17m.52s.
Guadalajara e =9m.30s., eSS =20m.20s.
Palisades iPP =11m.29s.
Harvard iSS =20m.45s.
Columbia iPcP =10m.34s., ePP =11m.41s., iSS =21m.8s.
Reykjavik iPcS?N =12m.48s., eN =14m.40s., iEN =19m.33s., eSS?EN =21m.0s., eN =22m.55s.
Halifax SS =21m.18s.
Zi-ka-wei iZ =14m.13s.
Nanking iPP =12m.34s., iN =18m.28s., SS? =22m.40s.
Bergen eNZ =12m.56s., iE =20m.45s.
Helsinki eEZ =12m.28s., iPSE =19m.31s.
Upsala iPN =10m.41s., iE =11m.0s., iPcP =11m.16s., e =12m.47s., iPcS =15m.16s. iSE =19m.19s., iE =21m.44s., iSS =23m.22s., eE =23m.46s., eN =23m.52s.
Aberdeen iPPPE =14m.40s., iE =16m.59s., iPSE =20m.2s., iE =22m.35s., iSSE = 24m.2s., iSSSE =26m.58s., iE =30m.3s.
Edinburgh PcPE =11m.24s., PcSE =15m.25s.
Durham iEN =13m.49s., iScSEN =20m.58s., iSKSEN =21m.15s.
Copenhagen 11m.17s., 13m.38s., and 21m.23s.

Continued on next page.

Rathfarnham Castle iZ =11m.19s. and 11m.41s., iPSEN =20m.27s., eSSE =24m.35s., eSSSE =28m.8s.
Kew ePcP =11m.37s., e =12m.5s., ePPP? =17m.2s., iPS? =21m.45s., e =24m.19s., eSSS =28m.59s.
De Bilt ePPP =15m.50s., eSS =25m.31s., eSSS =28m.35s.
Collmberg iZ =12m.21s., ePP?Z =14m.47s., eZ =17m.35s. and 21m.11s., eSSE = 25m.52s.
Jena iPEZ =11m.35s., iPcP?N =12m.20s., ePPNZ =14m.23s., eN =17m.1s., iSN = 21m.17s., iPS?N =21m.46s. and 21m.55s., eE =23m.15s., eN =23m.41s. and 26m.35s.
Sonneberg iPEN =11m.39s.
Cheb PE =11m.44s., ePPPN =16m.29s., eSSE =26m.3s., eSSS =29m.35s. and other unidentified e readings.
Prague ePPP =16m.29s., ePS =21m.46s., ePPS =22m.2s., eSS =26m.12s., eSSS = 29m.11s. and other unidentified e readings.
Paris iPcP =11m.57s., iPPP =16m.3s., iPS =21m.54s., iSS =25m.50s., and numerous unidentified i readings.
Raciborzu eEN =11m.44s.?, eZ =13m.11s., iZ =13m.38s., ePPP?E =16m.18s., eE = 17m.20s., eZ =21m.53s., eN =22m.29s., eSS?EN =25m.27s.
Strasbourg iP =11m.48s., iPcP =11m.58s., i =13m.32s., e =16m.7s., ePPP =16m.12s., e =19m.53s., iS =21m.29s., iPS =21m.56s., iSS =26m.31s., and 26m.40s., iSSS = 29m.42s. and 29m.52s., eQ =32m.29s.
Stuttgart iP =11m.47s., e =12m.26s., ePPP =16m.26s., eSS =26m.25s., eSSS =30m.11s., e =32m.29s.
San Juan e =13m.17s.
Skalnate Pleso eP =11m.48s., ePPP =16m.21s., PS =22m.5s., ePPS? =22m.16s., eSS =26m.16s., eSSSE =29m.30s. and other unidentified e readings.
Besançon iPcP =12m.10s., ePPP =16m.29s. and other unidentified readings.
Ogyalla ePPP =16m.41s., ePS =22m.22s., eSS =27m.23s., eSSSE =31m.16s., and many unidentified e readings.
Budapest PPE =14m.57s., PPPE =16m.54s., SKSE =22m.4s., PcSE =22m.20s., ePSE =22m.26s., PSN =22m.40s., PPSN =22m.54s., eSSE =26m.35s., SSN = 27m.26s., SSSN =30m.35s., SSSE =30m.45s.
Clermont-Ferrand iPS =22m.34s., eSS =26m.49s. and numerous unidentified readings.
Kalossa SE =22m.12s., SN =22m.38s., ePSN =22m.47s., PSE =22m.50s. and other unidentified readings.
Salo eZ =12m.40s. and 14m.32s., ePS?Z =22m.47s., e =26m.34s.
Pavia e =24m.18s.
Triest iScS? =22m.28s., iSPZ =23m.4s., iSPPZ =24m.3s., iSS =27m.15s.?.
Timisoara eE =15m.35s.
Padova iE =22m.3s.
Belgrade ePNW =12m.13s., eNW =25m.30s. and 35m.48s.
Bucharest ePP?E =15m.22s., ePPPN =17m.13s., iSKS?N =22m.39s., iPS?N =22m.57s., ePSE =23m.1s.
Florence e =14m.26s.
Chinchina iSS =27m.7s.
Mary PPP =17m.7s.
Tortosa PcPN =12m.29s., ScS?EN =22m.50s., PS?N =23m.38s., SSE =28m.3s.
Chatra ScSN =22m.55s., ScSZ =22m.58s., PSZ =23m.24s., PPSN =23m.45s.
Lisbon iSN =22m.41s.
Toledo pP? =13m.5s., i =14m.47s. and 15m.24s., SS =28m.8s., SSS? =31m.3s.
Bogota ePPEN =15m.40s.
Alicante i =12m.43s., PPP =17m.13s., PS =24m.3s., PPS =24m.31s., SS =28m.28s., SSS =31m.37s., Q =33m.54s.
Granada PcP =12m.51s., iPP =16m.3s., PPP =18m.6s., sS =23m.21s., i =26m.0s., iSS =28m.3s., SSS =31m.39s., Q =36m.5s.
New Delhi iPSN =23m.46s., PPSN =24m.6s., iSSN =28m.21s., SSSN =32m.24s.
Malaga iPPP =17m.55s., iSS =28m.45s.
Calcutta PSE =24m.4s., SSE =28m.34s., PKKPE =29m.52s., SSSE =32m.1s., QE = 35m.58s.
Almeria PPP =17m.55s., SS =28m.47s.
Algiers Univ eZ =17m.16s.
Messina eS? =23m.39s.
Brisbane eSSS?E =30m.47s.
Helwan PPZ =17m.8s., SSN =30m.49s.
Poona SKKSN =24m.16s., PSN =26m.1s., PPSN =26m.47s., SSSN =35m.23s.
Bombay iPPEN =17m.14s., iSN =24m.50s., iPSE =25m.29s., iSPN =26m.5s.
Huancayo ePP =17m.28s., ePS? =25m.57s., eSS =30m.59s.
Tamanrasset eZ =14m.19s. and 16m.24s., ePPPZ =20m.5s., ePSZ =26m.55s., ePKKPZ = 30m.9s., eSSP =32m.5s., ePKP,PKPZ =38m.23s., QZ =45m.53s.
Riverview iPPZ =18m.0s., iN =25m.39s., isSE =25m.45s., iE =31m.52s., iSSE = 32m.15s., iE =32m.35s., eQN =40·9m.
Kodaikanal ePPE =17m.58s., PPPE =20m.6s., PSE =26m.50s., PPSE =27m.40s., SSE =31m.52s., QE =42m.55s.
La Paz PS =27m.21s., iPPS =28m.17s., iSS =33m.5s., iSSS =37m.9s.
Christchurch ePPNZ =18m.21s., ePPPZ =21m.0s., PS =27m.14s., eSSEN =32m.45s., eSSSN =36m.35s., eQE =42m.15s.
La Plata SN =15m.29s., N =16m.47s., ScSN =17m.41s., SSE =18m.41s., L =23m.5s., P given as S and PP as L.
Tananarive e =22m.34s. and 35m.37s.

Feb. 13d. Readings also at 1h. (Kurmenty, Almata II, near Chilisk, Ili, and Krasnogorka), 2h. (Boulder City), 3h. (College, Hungry Horse, Boulder City, Overton, and Pierce Ferry), 4h. (Tamanrasset, near Athens, and Istanbul), 5h. (Tucson, Pretoria, La Plata, and Ashkabad), 7h. (College, Apia, Tiflis, near Gandzha, Stepanavan, and Tsikhlis-Dzhvari), 8h. (Bogota, Chinchina, Huancayo, Tacubaya, Vera Cruz, Tucson, Boulder City, Overton, Pierce Ferry, Hungry Horse, Mount Wilson, Riverside, Palomar, China Lake, and Tinemaha), 9h. (Tucson, near Andijan, Kulyab, and Khorog), 10h. (Tortosa), 11h. (Pierce Ferry), 12h. (Boulder City, Overton (2), Pierce Ferry (2), near Balboa Heights, and near Granada), 14h. (Santa Clara), 15h. (College and Tamanrasset), 16h. (Apia and near Kurmenty), 17h. (Palomar, Riverside, near La Jolla, Pasadena, Overton (2), Pierce Ferry (2), Boulder City (2), and Tucson), 18h. (Apia), 19h. (near Malaga), 20h. (New Delhi, Hungry Horse, Tamanrasset, Andijan, Stuttgart, and near Athens), 21h. (Borzhomi, Tiflis, near Gandzha, and Tsikhlis-Dzhvari), 22h. (Collmberg and Granada).

Feb. 14d. 0h. 51m. 47s. Epicentre 43°·7N. 126°·7W. (as on 1950, Dec. 16d.).

$A = -\cdot4335$, $B = -\cdot5815$, $C = +\cdot6884$; $\delta = -4$; $h = -3$;
$D = -\cdot802$, $E = +\cdot598$; $G = -\cdot411$, $H = -\cdot552$, $K = -\cdot725$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Arcata		3·4	144	e 0 45a	−10	e 1 53	S_g	—	—	—
Shasta Dam		4·4	132	e 1 14	+ 4	i 1 58	− 4	—	—	—
Seattle		5·0	36	e 1 27	+ 9	—	—	—	—	e 2·7
Mineral	z.	5·1	130	e 1 21a	+ 1	i 2 19	− 1	—	—	—
Victoria		5·3	24	1 25	+ 3	e 2 29	+ 4	e 1 38	P*	—
Reno		6·6	126	e 1 41	0	e 3 17	S*	—	—	—
Berkeley	z.	6·7	148	e 1 37a	− 5	—	—	i 1 54	P*	—
Lick	z.	7·4	147	i 1 50a	− 2	—	—	i 2 8	P*	—
Fresno		8·7	140	e 2 9k	− 1	e 4 3	+13	—	—	e 8·0
Tinemaha	z.	9·2	133	e 2 18	+ 2	—	—	—	—	—
Hungry Horse		10·0	58	i 2 28	+ 1	—	—	—	—	—
China Lake	z.	10·6	135	i 2 36	0	—	—	—	—	—
Logan		11·1	95	e 2 46	+ 3	—	—	—	—	—
Pasadena		11·6	142	i 2 48	− 2	—	—	—	—	—
Overton	z.	11·8	123	e 2 56	+ 3	—	—	—	—	—
Boulder City		11·9	126	e 2 56	+ 2	—	—	—	—	—
Riverside	z.	12·1	140	i 2 55	− 2	—	—	—	—	—
Pierce Ferry		12·3	124	i 3 2	+ 3	—	—	—	—	—
Palomar	z.	12·8	140	i 3 6	0	—	—	—	—	—
Rapid City	E.	16·9	80	e 4 9	+10	—	—	—	—	e 11·4
Tucson		16·9	127	e 4 0	+ 1	—	—	—	—	—
College		24·3	338	e 5 21	+ 1	—	—	—	—	—

Additional readings :—
Arcata eZ = 1m.23s. and 1m.58s., eN = 2m.39s.
Seattle e = 1m.56s.
Mineral iZ = 2m.4s.
Victoria e = 1m.29s.
Reno eE = 2m.3s., eN = 2m.33s. and 3m.7s.
Pasadena i = 2m.56s.

Feb. 14d. 21h. 12m. 28s. Epicentre 8°·7S. 124°·1E. (as on 1949, Sept. 27d.).

$A = -\cdot5543$, $B = +\cdot8186$, $C = -\cdot1503$; $\delta = -6$; $h = +7$;
$D = +\cdot828$, $E = +\cdot561$; $G = +\cdot084$, $H = -\cdot124$, $K = -\cdot989$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bandong		16·4	275	e 3 52	− 1	e 6 55	− 1	—	—	—
Djakarta		17·3	278	e 4 5	+ 1	e 7 18	+ 2	—	—	—
Perth		24·7	197	—	—	i 9 44	0	—	—	i 11·9
Brisbane	z.	33·1	128	e 6 40	0	—	—	i 7 25	PP	—
Riverview		35·7	139	i 4 43	?	i 12 33	− 6	—	—	—
Bombay	E.	57·5	298	e 12 52	PPP	e 17 57	+ 7	—	—	—
Naryn		66·6	323	—	—	e 19 45	0	—	—	—
Almata		67·1	326	e 11 0	+ 3	e 19 45	− 6	—	—	—
Rybach'e		67·2	324	11 16	+18	—	—	—	—	—
Frunse		68·3	323	e 11 11	+ 6	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		68·4	320	e 11 6	0	e 20 2	− 5	—	—	—
Kulyab		68·6	317	e 11 7	0	e 20 4	− 5	—	—	—
Tashkent		70·7	319	e 11 19	− 1	e 20 26	− 8	—	—	—
Tchimkent		71·0	320	i 11 17	− 5	—	—	—	—	—
Samarkand		71·4	317	e 11 30	+ 6	—	—	—	—	—
Ksara		93·3	303	—	—	e 27 25	?	e 38 41	Q	54·5
Hungry Horse		117·4	40	e 18 50	[+ 2]	—	—	—	—	—
Tamanrasset	z.	119·6	292	e 18 52	[0]	—	—	—	—	—
Overton	z.	120·3	53	e 18 55	[+ 2]	—	—	—	—	—
Pierce Ferry		120·7	53	e 19 7	[+13]	—	—	—	—	—

Long waves were also recorded at Wellington and Paris.

Feb. 14d. Readings also at 0h. (Wellington, College, Hungry Horse, and Tamanrasset), 1h. (near Balboa Heights), 2h. (near Almata II), 3h. (Collmberg, Oaxaca, Vera Cruz, near Puebla, Tacubaya, near Istanbul, and Yalta), 4h. (Pasadena, Riverside, China Lake, Tinemaha, Tucson, Overton, Fresno, Reno, Lick, Mineral, Hungry Horse, Huancayo, La Paz, and Tacubaya), 7h. (Andijan and Collmberg), 8h. (Collmberg, Durham, Ashkabad, College, and near Apia), 9h. (Andijan), 10h. (Pasadena, Riverside, China Lake, Tinemaha, Overton, Pierce Ferry, Lick, Reno, Mineral, Hungry Horse, Seattle, Victoria (2), College, (2) Resolute Bay, and near Erevan), 11h. (Apia, Mineral, and Andijan), 12h. (Collmberg), 13h. (Fergana, Kulyab, near Andijan, and Khorog), 14h. (Tamanrasset, Mineral, Oaxaca, Vera Cruz, near Puebla, and Tacubaya), 16h. (Boulder City), 17hl (near Gandzha and Tsikhlis-Dzhvari), 18h. (College, near Akhalkalaki, Gandzha, and Tsikhlis-Dzhvari), 19h. (near Klyuchi), 20h. (Hungry Horse, near Akhalkalaki, Gandzha, and Tsikhlis-Dzhvari), 23h. (near Akhalkalaki, Gandzha, and Tsikhlis-Dzhvari).

Feb. 15d. 5h. 20m. 22s. Epicentre 19°·0N. 104°·9W. (as on 1937, February 22d.).

A = −·2433, B = −·9144, C = +·3236 ; δ = +4 ; h = +5 ;
D = −·966, E = +·257 ; G = −·083, H = −·313, K = −·946.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manzanillo		0·5	85	0 14	0	—	—	—	—	0·4
Guadalajara		2·2	38	0 41	+ 3	—	—	—	—	1·2
Tacubaya		5·4	85	e 1 28	+ 4	e 2 37	+ 9	—	—	—
Puebla		6·3	89	1 40	+ 4	3 0	+10	—	—	—
Oaxaca		8·0	103	e 2 58	+58	—	—	—	—	—
Vera Cruz		8·3	87	2 6	+ 2	—	—	—	—	4·2
Tucson		14·2	339	i 3 27	+ 3	—	—	—	—	e 7·9
Palomar		17·8	326	i 4 12	+ 1	—	—	—	—	—
Riverside	z.	18·6	325	i 4 20	− 1	—	—	—	—	—
Pierce Ferry		18·8	338	i 4 24	+ 1	—	—	—	—	—
Boulder City		19·0	335	e 4 24	− 2	—	—	—	—	—
Pasadena		19·2	325	i 4 27	− 1	—	—	—	—	e 8·3
Overton	z.	19·4	336	i 4 30	0	—	—	—	—	i 11·2
China Lake	z.	20·2	331	i 4 37k	− 2	—	—	—	—	—
Tinemaha	z.	21·5	330	i 4 53	+ 1	—	—	—	—	—
Fresno	z.	22·0	328	e 4 57a	− 1	e 9 28	+32	—	—	—
Salt Lake City		22·5	347	e 5 2	0	—	—	—	—	e 13·5
Lincoln	E.	22·9	16	—	—	e 9 1	−12	—	—	e 12·2
Lick	z.	23·4	326	i 5 11k	0	—	—	—	—	—
Logan		23·4	348	e 5 11	0	e 9 13	− 8	—	—	e 11·9
Berkeley	z.	24·1	326	i 5 19	+ 1	—	—	—	—	—
Mineral	z.	25·7	330	i 5 32a	− 1	—	—	—	—	—
Hungry Horse		30·2	349	i 6 11	− 3	—	—	—	—	—
Victoria	z.	33·0	338	i 6 42	+ 3	—	—	—	—	—
San Juan		36·7	83	i 7 10	0	—	—	—	—	—
La Paz		50·5	131	9 1	− 1	—	—	—	—	—
College		53·9	339	e 9 25	− 2	—	—	e 10 28	PP	e 30·9

Additional readings :—
Tucson i = 3m.40s., e = 4m.6s.
Boulder City iP = 4m.28s.
Fresno eEN = 5m.1s., e = 7m.44s.
Lick iZ = 5m.14s. and 5m.21s.
Berkeley eZ = 5m.27s. and 6m.56s.
Mineral iZ = 5m.35s., eZ = 5m.47s.
Long waves were also recorded at Palisades, Seven Falls, Seattle, Saskatoon, and Resolute Bay.

Feb. 15d. 7h. 11m. 23s. Epicentre 32°·8N. 130°·2E.

Intensity VI at Unzendake ; V at Nagasaki, Kumamoto, Hukuoka, Misumi, Takahama, and Kuchinotu ; IV at Izuhara, Tomioka, Amagi, Minagi, Maebaru, Himosashi, Hirato, and Hukusima ; II-III at Miyazaki and Uchino.
Epicentre as adopted. Shallow.

Seismo. Bull. Cent. Met. Obs., Japan, 1951, Tokyo, 1951, p. 40, with macroseismic chart.

$A = -\cdot5436$, $B = +\cdot6433$, $C = +\cdot5391$; $\delta = -4$; $h = +1$;
$D = +\cdot764$, $E = +\cdot645$; $G = -\cdot348$, $H = +\cdot412$, $K = -\cdot842$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Unzendake		0·1	—	0 0	− 8	0 1	−12	—	—	—
Nagasaki		0·3	257	0 6k	− 5	0 10	− 8	—	—	—
Kumamoto		0·4	88	0 9a	− 4	0 16	− 5	—	—	—
Saga		0·5	11	0 13a	− 1	0 23	0	—	—	—
Hukuoka		0·8	13	0 17a	− 1	0 28	− 3	—	—	—
Tomie		1·2	261	0 27k	+ 3	0 41	0	—	—	—
Kagosima		1·3	166	0 23a	− 2	0 55	+11	—	—	—
Ooita		1·3	70	0 26a	+ 1	0 42	− 2	—	—	—
Simonoseki		1·3	28	0 31	+ 6	0 48	+ 4	—	—	—
Miyazaki		1·4	130	0 26a	− 1	0 46	0	—	—	—
Ituhara		1·6	331	0 33	+ 3	0 53	+ 2	—	—	—
Simidu		2·3	90	0 41	+ 1	1 12	+ 3	—	—	—
Hirosima		2·4	50	0 42	+ 1	1 15	+ 3	—	—	—
Matuyama		2·4	64	0 42	+ 1	1 12	0	—	—	—
Yakusima		2·4	174	0 40	− 1	1 13	+ 1	—	—	—
Hamada		2·6	36	0 47	+ 3	1 24	S_g	—	—	—
Matsui		3·6	42	1 15	P_g	1 52	S*	—	—	—
Himeji		3·9	63	1 10	P*	2 14	S_g	—	—	—
Sumoto		4·2	67	1 21	P_g	2 12	S*	—	—	—
Saigo		4·3	37	2 30	S_g	—	—	—	—	—
Wakayama		4·4	70	1 20	P*	2 25	S_g	—	—	—
Kobe		4·6	64	1 10	− 2	2 26	S_g	—	—	—
Osaka		4·8	66	1 20	+ 5	2 28	S*	—	—	—
Owase		5·2	74	1 21	0	2 47	S_g	—	—	—
Hikone		5·6	63	1 33	+ 6	2 58	S_g	—	—	—
Kameyama		5·6	67	1 33	+ 6	3 10	S_g	—	—	—
Tsuruga		5·6	58	1 27	0	2 47	S*	—	—	—
Gihu		6·0	63	1 33	+ 1	2 57	S*	—	—	—
Hukui		6·0	56	2 49	S	(2 49)	+ 6	—	—	—
Nagoya		6·1	66	1 35	+ 1	3 11	S*	—	—	—
Toyama		6·9	54	3 16	S	(3 16)	+11	—	—	—
Matumoto		7·3	60	2 33	P_g	3 55	S_g	—	—	—
Zi-ka-wei	z.	7·6	260	e 3 31	S	(e 3 31)	+ 8	3 51	S*	—
Nagano		7·6	58	2 5	+10	4 3	S_g	—	—	—
Oiwake		7·8	61	2 7	+ 9	—	—	—	—	—
Maebasi		8·1	61	2 6	+ 4	—	—	—	—	—
Nanking		9·7	268	e 3 29	?	—	—	—	—	e 4·8
Vladivostok		10·4	7	e 2 19	−15	e 4 23	− 9	—	—	—
Kabansk		25·7	325	e 5 34	+ 1	10 18	+17	—	—	—
Irkutsk		27·0	324	—	—	e 10 37	+15	—	—	—
Tchimkent		48·1	300	e 9 25	+42	—	—	—	—	—
Sverdlovsk		52·3	320	9 13	− 2	e 16 42	+ 2	—	—	—
College		57·5	30	e 9 50	− 3	—	—	—	—	—
Moscow		65·0	322	e 10 41	− 3	—	—	—	—	—
Shasta Dam		80·9	47	e 12 16	− 1	—	—	—	—	—
Hungry Horse		81·0	38	i 12 17	− 1	—	—	—	—	—
Mineral	z.	81·6	47	e 12 19a	− 2	—	—	—	—	—
Berkeley	z.	82·6	50	i 12 25	− 1	—	—	—	—	—
Lick	z.	83·3	50	e 12 31a	+ 1	—	—	—	—	—
Stuttgart		83·3	325	e 12 23	− 7	—	—	—	—	e 45·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fresno	z.	84·9	49	e 12 36 a	− 2	—	—	—	—	—
Tinemaha	z.	85·7	49	e 12 41	− 1	—	—	—	—	—
Logan		86·4	42	e 12 45	0	—	—	—	—	—
China Lake	z.	86·8	49	e 12 46	− 1	—	—	—	—	—
Riverside	z.	88·1	50	e 12 48	− 6	—	—	—	—	—
Overton	z.	88·3	47	i 12 54	− 1	—	—	—	—	—
Boulder City		88·5	47	i 12 55	− 1	—	—	—	—	—
Pierce Ferry		88·9	47	i 12 57	− 1	—	—	—	—	—
Tucson		93·4	48	e 13 18	0	—	—	—	—	—
Washington	z.	104·3	22	e 15 35	?	—	—	—	—	—

Additional readings :—
Nagoya S = 3m.18s.
Zi-ka-wei eSZ = 4m.44s., iZ = 4m.56s. and 7m.2s.
Long waves were also recorded at Almeria.

Feb. 15d. 8h. 23m. 20s. Epicentre 29°·0N. 98°·0E. (as on 1949, July 15d.).

A = −·1219, B = +·8675, C = +·4823 ; δ = +3 ; h = +2 ;
D = +·990, E = +·139 ; G = −·067, H = +·478, K = −·876.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Chatra	z.	9·8	260	2 26	+ 2	i 4 12	− 5	3 15	P_g
New Delhi		18·2	274	e 4 11	− 5	7 32	− 5	4 25	PP
Kurmenty		21·2	317	i 4 46	− 3	—	—	—	—
Naryn		21·8	312	e 4 52	− 4	e 8 43	− 9	—	—
Almata		22·1	317	e 4 55	− 4	8 51	− 7	—	—
Rybach'e		22·2	313	e 4 54	− 6	e 8 45	−15	—	—
Ili		22·4	318	i 4 58	− 4	—	—	—	—
Krasnogorka		23·2	313	e 5 7	− 2	—	—	—	—
Frunse		23·4	312	i 5 9	− 2	i 9 16	− 5	—	—
Khorog		23·6	297	e 5 13	0	—	—	—	—
Irkutsk		23·7	9	e 5 19	+ 5	—	—	—	—
Kabansk		23·9	12	e 5 21	+ 5	—	—	—	—
Andijan		24·0	305	5 16	− 1	e 9 31	− 1	—	—
Fergana		24·3	305	e 5 18	− 2	—	—	—	—
Poona		24·4	250	e 5 28	+ 7	e 9 45	+ 6	—	—
Bombay		25·1	252	e 5 35	+ 7	e 9 54	+ 3	—	—
Kulyab		25·1	299	i 5 26	− 2	i 9 46	− 5	—	—
Lunacharskoe		26·4	306	e 5 41	+ 1	—	—	—	—
Tashkent		26·4	306	i 5 39	− 1	i 10 8	− 4	—	—
Tchimkent		26·5	308	i 5 40	− 1	—	—	—	—
Samarkand		27·6	301	e 5 49?	− 2	—	—	—	—
Mary		31·2	296	e 6 47	+24	—	—	—	—
Sverdlovsk		38·2	328	i 7 24	+ 1	e 13 12	− 5	—	—
Shemakla		41·7	300	e 8 10	+18	—	—	—	—
Kirovobad		43·4	300	8 7	+ 1	—	—	—	—
Moscow		50·0	321	e 8 58	0	—	—	—	—
Jena	E.	65·9	316	e 10 56	+ 6	—	—	—	—
Stuttgart	z.	68·1	315	e 11 6	+ 2	—	—	—	—
College		73·6	24	i 11 44	+ 7	—	—	—	—
Tamanrasset	z.	81·3	291	i 12 25 k	+ 5	—	—	—	—
Hungry Horse		97·7	21	e 13 47	+ 9	—	—	—	—

Additional readings :—
Chatra PPEZ = 2m.31s., PPPZ = 2m.39s., P*Z = 2m.47s., QZ = 4m.6s., SSEZ = 4m.23s., S*EZ = 4m.48s.
New Delhi PPPE = 4m.33s., iSEN = 7m.13s.
Long waves were recorded at Nanking and Zi-ka-wei.

Feb. 15d. 10h. 47m. 56s. (I) } Epicentre 33°·5N. 116°·6W.
10h. 49m. 56s. (II) } (as on 1941, February 23d.).

Intensity V at Anza Borego Valley, Palm Springs, Palomar Mountain, Riverside, and San Diego. Epicentre 33° 29′ N. 116° 30′ W. Macroseismic area 7000 sq. m.

L. M. Murphy and W. K. Cloud.
United States Earthquakes, 1951, Serial 762, Washington, 1953, p. 10.

A = −·3741, B = −·7472, C = +·5493 ; δ = −1 ; h = +1 ;
D = −·894, E = +·448 ; G = −·246, H = −·491, K = −·836.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I Palomar		0·3	236	i 0 10a	− 1	—	—	—	—	—
I Perris	Z.	0·6	298	i 0 16	+ 1	—	—	—	—	—
I La Jolla		0·8	221	i 0 19	+ 1	i 0 31	0	—	—	—
II		0·8	221	i 0 17	− 1	i 0 29	− 2	—	—	—
I Riverside		0·8	307	i 0 19	+ 1	i 0 30	− 1	—	—	—
II		0·8	307	i 0 18	0	i 0 30	− 1	—	—	—
I Pasadena		1·5	296	i 0 28	0	i 0 50	+ 1	—	—	—
II		1·5	296	i 0 29a	+ 1	i 0 49	0	—	—	—
I Boulder City		2·9	30	i 0 47	− 1	i 1 32	+ 8	i 0 56	P_g	—
II		2·9	30	i 0 55	+ 7	—	—	—	—	—
I Pierce Ferry		3·4	38	i 0 54	− 1	i 1 48	S*	i 1 6	P_g	—
I Overton	Z.	3·5	30	i 0 56	− 1	—	—	i 1 7	P_g	—
I Fresno		4·1	323	e 1 12	+ 7	e 1 55	0	e 1 20	P_g	—
I Tucson		5·0	102	e 1 14	− 4	e 2 12	− 6	i 1 39	P_g	i 2·6
I Lick		5·6	316	i 1 29a	+ 2	e 2 33	0	i 1 48	P_g	—
I Santa Clara	N.	5·8	313	e 2 16	?	i 3 25	?	—	—	—
II	N.	5·8	313	e 2 4	?	i 3 23	?	—	—	—
I Berkeley	Z.	6·4	315	i 1 41	+ 3	e 2 58	+ 5	e 3 35	S_g	—
I Mineral	Z.	7·9	331	e 2 7a	+ 8	i 3 46	+16	i 2 34	P_g	—
II Shasta Dam		8·5	329	e 1 58?	− 9	—	—	i 2 31	P*	—
I Logan		9·1	23	e 2 54	P_g	—	—	—	—	—
II		9·1	23	e 2 51	P_g	—	—	—	—	—
I Hungry Horse		15·0	7	e 3 42	+ 7	—	—	—	—	—
II		15·0	7	e 3 41	+ 6	—	—	—	—	—

Additional readings :—
Pasadena I i = 31s.
Fresno I eE = 2m.4s., eNZ = 2m.12s.
Tucson I iP = 1m.20s., i = 1m.34s.
Santa Clara I eN = 3m.12s.
Mineral I iZ = 2m.20s., eE = 4m.6s.

Feb. 15d. Readings also at 1h. (Algiers Univ.), 2h. (Washington, Pierce Ferry, Mineral, Hungry Horse, and College), 3h. (Overton, Pierce Ferry, and Collmberg), 4h. (Pierce Ferry), 5h. (near Almata II), 7h. (Overton and Pierce Ferry), 8h. (near Andijan), 9h. (Hungry Horse, College, and near Mizusawa), 10h. (College and Tamanrasset), 11h. (Andijan and near Kurmenty), 12h. (near Zürich and near Overton), 13h. (Overton, Pierce Ferry, and near College), 15h. (Merida and Seattle), 16h. (Boulder City, Overton, and College), 17h. (near Athens), 18h. (Hungry Horse, near Ashkabad, and Mary), 20h. (Bogota, Chinchina, La Paz, Huancayo, Palomar, Riverside, China Lake, Boulder City, Overton, Pierce Ferry, Hungry Horse, Tamanrasset, Alicante, Almeria, Paris, Rome, Pavia, Granada, and Istanbul), 21h. (near Ottawa, near Athens, and Istanbul), 22h. (Pierce Ferry, near Ili, near Athens and Istanbul).

Feb. 16d. 9h. 56m. 45s. Epicentre 36°·1N. 139°·5E. Depth of focus 0·010.

Intensity V at Goryo; IV at Titibu, Kumagaya, Utunomiya, Makabe, Katakura, Numatu, Ogano, Owada; II-III at Tukubasan, Mito, and Tokyo. Epicentre as adopted. Depth 90km.

Seismo. Bull. Cent. Met. Obs., Japan, 1951. Tokyo, 1951, p.41, with macroseismic chart.

$A = -\cdot 6158$, $B = +\cdot 5260$, $C = +\cdot 5866$; $\delta = -1$; $h = 0$;
$D = +\cdot 649$, $E = +\cdot 760$; $G = -\cdot 446$, $H = +\cdot 381$, $K = -\cdot 810$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Kumagaya		0·1	298	0 16	+ 2	0 27	+ 3
Titibu		0·3	251	0 15	0	0 26	0
Maebasi		0·4	311	0 16a	+ 1	0 27	0
Tokyo		0·5	154	0 16k	0	0 28	0
Tukubasan		0·5	76	0 17	+ 1	0 29	+ 1
Utunomiya		0·5	33	0 17a	+ 1	0 29	+ 1
Yokohama		0·7	170	0 17k	− 1	—	—
Mito		0·8	70	0 21a	+ 3	0 36	+ 4
Hunatu		0·9	225	0 19	0	0 31	− 3
Kohu		0·9	238	0 19	0	0 33	− 1
Matusiro		1·1	294	0 22	0	0 38	0
Misima		1·1	204	0 19	− 3	0 34	− 4
Mera		1·2	167	0 23	0	—	—
Nagano		1·2	298	0 22	− 1	0 39	− 1
Shirakawa		1·2	30	0 26	+ 3	0 45	+ 5
Matumoto		1·3	276	0 25	+ 1	0 41	− 1
Osima		1·3	184	0 23	− 1	—	—
Onahama		1·4	53	0 35a	+10	0 50	+ 6
Takada		1·4	315	0 25	0	0 41	− 3
Iida		1·5	247	0 27	0	0 43	− 4
Inawashiro		1·5	19	0 30	+ 3	0 54	+ 7
Hukusima		1·8	25	0 33	+ 3	1 2	+ 9
Takayama		1·8	278	0 27	− 3	—	—
Niigata		1·9	349	0 37	+ 5	1 23	+28
Toyama		1·9	287	0 34	+ 2	1 8	+13
Aikawa		2·2	333	0 34	− 2	1 1	− 1
Gihu		2·3	252	0 40	+ 3	1 6	+ 1
Nagoya		2·3	246	0 35	− 2	1 1	− 4
Sendai		2·4	27	0 41	+ 3	1 17	+10
Wazima		2·4	301	0 38	0	1 9	+ 2
Hukui		2·6	269	1 2	+21	(1 2)	−10
Hikone		2·8	252	0 44	0	1 14	− 3
Kameyama		2·8	243	0 41	− 3	1 44	+27
Tsuruga		2·8	261	0 44	0	1 10	− 7
Kyoto		3·3	251	0 48	− 3	—	—
Mizusawa	E.	3·3	23	0 54	+ 3	1 32	+ 3
Owase		3·4	234	0 50k	− 2	1 56	+24
Osaka		3·5	247	0 52	− 2	—	—
Akita		3·6	7	1 1	+ 6	1 47	+10
Morioka		3·8	20	1 0	+ 2	1 50	+ 8
Toyooka		3·8	263	0 45	−13	1 31	−11
Miyako		4·0	28	1 3	+ 3	1 48	+ 2
Sumoto		4·1	246	1 1	− 1	—	—
College		50·7	31	i 8 52	0	—	—
Hungry Horse		73·5	41	i 11 23	− 1	—	—
Boulder City		80·5	52	i 12 3	0	—	—

Feb. 16d. 19h. South Pacific.
Brisbane ePEN =11m.40s., eSEN =14m.52s., eLE =16m.11s.
Riverview ePZ =12m.41s.k, iPZ =12m.47s., iZ =13m.1s., iE =13m.14s., iN =13m.36s. iSN =16m.40s., iN =16m.45s., iZ =16m.55s., iN =17m.1s.
Wellington eP =13m.16s., iPP =13m.53s., ePPP? =14m.22s., eS? =17m.45s., eSS? = 18m.22s., e =18m.42s., eR =19m.43s.
Berkeley ePZ =20m.37s., eZ =20m.47s. and 21m.3s.
Lick ePZ =20m.39s.a, iZ =20m.52s.
Shasta Dam eP? =20m.42s.
Fresno ePZ =20m.42s.a, eN =21m.28s., eZ =23m.33s.
China Lake ePZ =20m.43s.
Mineral ePZ =20m.45s.a, iZ =20m.54s. and 21m.12s.
Palomar iPZ =20m.47s.
Riverside ePZ =20m.47s.
Tinemaha ePZ =20m.49s.
Boulder City eP =20m.50s.
College eP =20m.50s.
Overton iPZ =21m.2s.
Pierce Ferry iP =21m.3s.
Tucson iP =21m.9s.
Korror P =22m.32s.
Ksara ePKP? =27m.14s., PP? =30m.1s.
Collmberg eZ =27m.19s.
Stuttgart ePKPZ =27m.28s., ePPP? =33m.48s.
Triest iPZ =27m.30s., e =28m.1s.
Strasbourg iPKP =27m.32s., e =27m.42s.
Chur ePKP =27m.34s.
Zürich ePKP =27m.34s.
Basle ePKP =27m.36s.
Besançon ePKP =27m.38s.
Paris iPKP =27m.38s.
Rome iPKPZ =27m.39s.k, ePP?Z =30m.42s., eE =51m.19s.
Pavia iPKP?Z =27m.39s.k, e =34m.12s.
Clermont-Ferrand PKP =27m.43s.
Tamanrasset ePKPZ =27m.55s.
Helwan eZ =30m.11s. and 30m.39s.
Long waves were also recorded at Auckland, Almeria, and Granada.

Feb. 16d. Readings also at 0h. (near Istanbul and near Harvard), 2h. (Chatra and College), 3h. (Strasbourg, near Almata II, Ili, and Kurmenty), 5h. (Ashkabad (7), Copenhagen, Rapid City, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Hungry Horse, and Victoria), 6h. (Ashkabad (5)), 7h. (Ashkabad (2), near Huancayo, and near Andijan), 8h. (near Kulyab), 9h. (Mount Wilson, China Lake, Tucson, Boulder City, Overton, Pierce Ferry, Hungry Horse, College, Andijan, and near Klyuchi), 10h. (Krasnogorka and near Ili), 11h. (Chatra), 12h. (Alicante (2) and College), 14h. (Ashkabad), 15h. (near Borzhomi and Tiflis), 17h. (Pierce Ferry, La Paz, near Huancayo, near Harvard, near Alicante, and near Tananarive), 18h. (Collmberg, Stuttgart, Tamanrasset, Huancayo, Bucharest, Sofia, near Athens, Istanbul, near Yalta, Chilisk, Kurmenty, Rybach'e, Samarkand, near Andijan, Fergana, Frunse, Ili, Krasnogorka, and Tchimkent), 20h. (Pierce Ferry, Kirovobad, near Akhalkalaki, Gandzha, and Tsikhlis-Dzhvari), 21h. (China Lake, Tinemaha, College (2), Bombay, Calcutta, New Delhi, Collmberg, Stuttgart, Strasbourg, Paris, and Besançon), 22h. (Pierce Ferry, Almata II, Andijan, Fergana, Krasnogorka (2), Tchimkent, near Almata, Chilisk (3), Ili (3), Frunse, Kurmenty (3), Naryn, Rybach'e, near Huancayo, and La Paz), 23h. (College, Almata II, near Chilisk, Ili, and Kurmenty),

Feb. 17d. 20h. 36m. 6s. Epicentre 44°·0N. 16°·8E. (as on 1939, July 2d.).

$A = +\cdot6909$, $B = +\cdot2086$, $C = +\cdot6922$; $\delta = 0$; $h = -3$;
$D = +\cdot289$, $E = -\cdot957$; $G = +\cdot663$, $H = +\cdot200$, $K = -\cdot722$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Belgrade	Z.	2·7	73	e 0 40$_s$	− 5	i 1 19	0	i 0 48 P*	—
Triest		2·7	307	e 0 43	− 2	i 1 13	− 6	i 0 50 P$_g$	—
Kalossa		3·0	31	0 57	P$_g$	i 1 51	S$_g$	— —	—
Taranto		3·5	174	1 2	+ 5	e 1 42	+ 2	1 17 P$_g$	—
Padova		3·6	280	—	—	e 2 8	S$_g$	— —	—
Timisoara		3·6	59	i 1 1	+ 3	i 1 43	+ 1	i 1 23 P$_g$	—
Rocca di Papa		3·7	235	e 1 5	P*	e 2 3	S$_g$	— —	—
Rome		3·8	238	e 0 56	− 5	i 1 40	− 7	1 2 P	i 2·2
Budapest		3·8	24	e 1 0	− 1	e 2 7	S$_g$	e 1 11 P*	—
Bologna		4·0	279	e 1 25	P$_g$	e 2 0	P*	— —	e 2·8

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ogyalla		4·0	14	—	—	e 1 37	−15	e 1 56	S	—
Prato		4·1	270	e 1 30	P_g	i 2 26	S_g	—	—	—
Vienna		4·3	356	e 1 10?	+ 2	e 2 17	S*	e 1 24	P_g	—
Salo		4·8	292	e 1 36	P_g	e 2 16	+ 4	e 2 45	S_g	e 2·8
Sofia		4·9	104	e 1 16	− 1	e 2 20	+ 5	—	—	—
Pavia		5·6	285	—	—	e 2 22	−11	—	—	e 3·9
Chur		5·8	301	e 1 27	− 2	—	—	—	—	—
Messina		5·9	190	e 2 5	P_g	e 3 0	S*	—	—	—
Raciborzu	E.	6·2	8	e 1 58	P_g	e 3 9	S_g	—	—	—
Prague		6·3	346	e 2 4	P_g	e 2 52	+ 2	e 3 21	S_g	—
Ravensburg		6·3	310	e 1 42?	+ 6	e 3 39	S_g	—	—	—
Zürich		6·6	303	e 1 38	− 3	e 2 56	− 2	e 3 21	S*	—
Bucharest		6·7	81	—	—	e 2 48	−12	e 3 38	S_g	—
Cheb		6·8	335	—	—	e 3 19	S*	—	—	—
Stuttgart	z.	7·1	315	e 1 43	− 5	e 3 8	− 2	e 4 1	S_g	—
Basle		7·4	303	e 2 39	P_g	e 4 0	S_g	—	—	—
Neuchatel		7·5	297	—	—	e 3 6	−14	—	—	e 4·4
Collmberg	z.	7·7	343	e 2 4	+ 8	e 3 27	+ 2	e 4 24	S_g	—
Jena	E.	7·8	334	e 2 51?	P_g	e 3 29	+ 1	e 4 13	S_g	—
Strasbourg		7·8	310	e 2 28	P_g	e 3 30	+ 2	e 4 20	S_g	e 4·7
Besançon		8·3	298	e 2 46	P_g	e 3 52	+12	e 4 45	S_g	—
Ksara		18·0	118	e 5 21	+68	12 23	PcS	—	—	—

Additional readings :—
Belgrade eZ = 1m.1s., i$P_g S_g$Z = 1m.16s.
Triest iS_g = 1m.28s., i$S_g S_g$ = 1m.34s.
Kalossa iE = 1m.3s., iN = 1m.7s., iE = 1m.31s., iN = 1m.36s., iE = 1m.45s., iN = 2m.4s., iEN = 2m.11s., iE = 2m.34s., and 2m.45s., iN = 3m.0s., iE = 4m.22s.
Padova e = 2m.58s. and 3m.39s.
Timisoara eE = 1m.55s., iSN = 2m.0s., iS*N = 2m.10s.
Rome iS*Z = 1m.56s., S_g = 2m.2s.
Budapest iE = 2m.26s. and 2m.41s.
Ogyalla e = 1m.45s., 2m.6s., 2m.15s., and 2m.24s.
Vienna eP* = 1m.19s., iS_g = 2m.26s.
Raciborzu eZ = 2m.1s.
Prague eE = 2m.7s., e = 2m.15s., eS = 2m.40s., eS* = 3m.1s., e = 3m.12s.
Bucharest eE = 3m.14s., eN = 3m.24s.
Stuttgart ePZ = 1m.48s., eZ = 1m.52s. and 1m.57s., eS*?Z = 3m.47s., eZ = 4m.6s. and 4m.32s.
Collmberg eS*?Z = 3m.51s.
Jena eE = 3m.15s., eS_gE = 3m.42s., eE = 4m.21s. and 4m.33s.
Strasbourg e = 2m.36s. and 3m.37s., eS* = 3m.59s.
Besançon e = 3m.14s. and 4m.5s.
Long waves were also recorded at Istanbul.

Feb. 17d. 21h. 7m. 11s. Epicentre 7°·1S. 146°·0E. Depth of focus 0·025.

A = −·8228, B = +·5550, C = −·1228 ; δ = +10 ; h = +7 ;
D = +·559, E = +·828 ; G = +·102, H = −·069, K = −·992.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guam		20·5	356	4 10	−14	—	—	—	—	—
Brisbane		21·4	162	i 4 31	− 2	i 7 15	+ 1	—	—	—
Riverview		27·0	170	i 5 26$_a$	0	i 9 49	0	i 6 3	pP	—
Manila		32·9	312	i 6 18	0	e 11 21	0	i 6 38	pP	—
Perth		37·4	223	i 6 58	+ 2	12 34	+ 5	8 4	PP	—
Djakarta		38·9	269	i 7 7	− 1	i 12 51	− 1	—	—	—
Auckland	N.	39·6	142	i 7 11	− 3	i 13 3	+ 1	e 16 46	ScS	—
Yakusima		40·2	339	7 21	+ 2	13 13	+ 2	—	—	—
New Plymouth	E.	40·6	145	e 7 26?	+ 4	e 13 19?	+ 2	e 17 19	ScS	—
Kagosima		41·2	340	i 7 28	+ 1	i 13 29	+ 3	i 17 12	ScS	—
Cobb River	E.	41·4	148	i 7 30	+ 1	e 13 32	+ 3	—	—	—
Siomisaki		41·5	348	i 7 28	− 2	13 29	− 1	9 11	PP	—
Simidu		41·6	345	i 7 30	− 1	i 13 31	− 1	—	—	—
Kaimata	N.E.	41·8	151	7 33	+ 1	i 13 36	+ 1	e 17 9	ScS	—
Apia		42·0	102	i 7 34	0	13 35	− 3	i 8 6	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Owasc		42·0	350	i 7 34	0	13 38	0	9 16	PP	—
Koti		42·1	345	i 7 36	+ 1	i 13 41	+ 2	e 8 19	pP	—
Tuai	N.	42·2	143	7 36	0	i 13 41	0	e 17 11	ScS	—
Misima	N.	42·5	352	7 37	− 1	13 44	− 1	9 0	PP	19·5
Wellington		42·6	147	i 7 37	− 2	i 13 45	− 1	i 8 22	pP	19·3
Kameyama		42·7	350	7 29	−11	13 50	+ 2	i 17 22	ScS	23·8
Osaka		42·7	348	i 7 33	− 7	e 13 34	−14	e 9 13	PP	—
Kobe		42·8	348	i 7 40	0	i 13 50	+ 1	e 8 27	pP	—
Nagoya		42·9	350	i 7 42	+ 1	13 53	+ 2	17 24	ScS	—
Tokyo		43·0	353	i 7 40	− 2	e 13 25	−27	8 43	pP	—
Hukuoka		43·1	342	i 7 43	0	e 13 54	0	i 17 25	ScS	—
Christchurch		43·2	151	—	—	i 13 55	0	14 59	sS	e 20·8
Hamada		43·8	344	i 7 49	+ 1	i 14 15	+11	i 17 28	ScS	—
Maebasi		43·8	352	i 7 47	− 1	e 13 58	− 6	e 17 27	ScS	—
Matusiro		44·0	352	7 50	0	14 6	− 1	15 7	sS	—
Onahama		44·1	355	i 7 51	0	i 14 7	− 1	17 29	SS	—
Toyama		44·3	351	7 53	+ 1	14 11	0	9 9	sP	—
Zi-ka-wei	Z.	44·7	331	i 7 57	+ 1	i 14 20	+ 3	i 8 34	pP	i 18·0
Wazima		45·1	351	e 7 59	0	e 14 23	+ 1	e 17 38	ScS	—
Sendai		45·4	356	i 8 0	− 1	i 14 27	0	17 37	ScS	—
Mizusawa		46·2	356	e 8 6	− 1	14 39	+ 1	—	—	—
Nanking		46·8	328	i 8 13k	+ 1	i 14 52	+ 5	i 9 2	pP	—
Akita		46·9	355	i 8 14	+ 1	i 14 54	+ 6	10 10	PP	—
Aomori		47·9	356	8 22	+ 1	15 5	+ 3	i 18 11	ScS	—
Nemuro		50·2	0	i 8 38	0	i 15 36	+ 2	e 18 9	ScS	—
Vladivostok		51·6	347	i 8 48	− 1	i 15 56	+ 3	i 9 27	pP	—
Yuzno-Sakhlinsk		53·9	358	i 9 8	+ 2	16 29	+ 5	—	—	—
Honolulu		61·9	61	i 9 59	− 2	e 18 11	+ 3	i 10 39	pP	e 25·1
Calcutta	E.	63·6	300	i 10 16	+ 4	18 33	+ 4	21 38	sScS	—
Klyuchi		64·4	10	i 10 16	− 2	e 18 41	+ 2	i 10 59	pP	—
Chatra		66·2	303	i 10 30	+ 1	e 19 8	+ 7	11 6	PcP	—
Adak		66·9	25	i 10 34	0	—	—	—	—	—
Colombo	N.	67·4	281	10 38	+ 1	(19 18)	+ 3	—	—	19·3
Kabansk		67·8	335	i 10 41	+ 2	i 19 27	+ 7	—	—	—
Irkutsk		69·0	334	i 10 47	+ 1	i 19 41	+ 7	—	—	—
Kodaikanal	E.	70·4	284	i 10 57	+ 2	i 19 57	+ 6	13 33	PP	31·7
Hyderabad	N.	71·0	292	i 10 57	− 2	i 19 56	− 2	20 43	ScS	32·6
Dehra Dun	N.	74·9	305	e 12 19	+58	e 21 43	+62	—	—	—
New Delhi		75·1	302	i 11 21	− 2	i 20 42	− 1	14 0	PP	33·4
Poona		75·5	292	i 11 23	− 2	i 20 44	− 4	11 43	PcP	33·0
Bombay		76·6	292	11 31	0	16 14	PPP	14 21	PP	34·2
Chilisk		79·0	318	i 11 47	+ 3	i 21 32	+ 7	—	—	—
Almata II		79·6	317	i 11 49	+ 2	—	—	—	—	—
Almata		79·9	317	i 11 51	+ 2	i 21 40	+ 5	i 12 35	pP	—
Ili		80·0	318	i 11 51	+ 2	i 21 39	+ 3	—	—	—
Naryn		80·0	314	i 11 49	0	i 21 38	+ 2	i 12 30	pP	—
Rybach'e		80·2	316	i 11 54	+ 4	i 21 41	+ 3	12 39	pP	—
Semipalatinsk		80·4	324	e 12 0?	+ 9	i 21 50?	+10	—	—	—
Krasnogorka		81·1	316	i 11 56	+ 1	i 30 31	SSS	—	—	—
Frunse		81·4	315	i 11 58	+ 1	i 21 54	+ 4	12 44	pP	—
Khorog		82·1	309	12 4	+ 4	—	—	—	—	—
Andijan		82·4	313	12 3	+ 1	i 22 3	+ 3	12 48	pP	—
Kulyab		83·6	310	e 12 10	+ 2	e 22 16	+ 4	—	—	—
Lunacharskoe		84·8	312	i 12 17	+ 3	i 22 27	+ 3	—	—	—
Tashkent		84·8	312	i 12 15	+ 1	i 22 28	+ 4	i 12 59	pP	—
Tchimkent		84·8	314	i 12 13?	− 1	i 22 27?	+ 3	—	—	—
Samarkand		86·1	311	i 12 21	+ 1	i 22 40	+ 4	—	—	—
College		86·6	23	i 12 20	− 3	i 22 40	− 1	i 13 11	pP	—
Mary		89·7	306	i 12 39	+ 2	e 16 12	PP	e 13 24	pP	—
Sitka		89·9	33	i 12 38	0	i 22 47	[− 2]	i 16 11	PP	e 37·4

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ashkabad		92·5	308	i 12 50	0	—	—	—	—	—
Sverdlovsk		93·4	327	i 12 54	− 1	i 23 42	0	i 13 40	pP	—
Arcata		94·5	50	i 13 3k	+ 3	i 16 48	PP	e 13 51	pP	—
Ukiah		95·0	51	e 13 3	+ 1	e 23 21	[+ 4]	i 16 56	PP	e 39·6
Victoria		95·6	42	i 14 5k	+60	i 23 54	− 7	e 17 58	PP	40·8
Berkeley		95·7	53	i 13 6k	+ 1	i 23 24	[+ 3]	i 13 55	pP	—
Tananarive		95·7	251	13 4	− 1	24 5	+ 3	16 57	PP	e 40·3
Shasta Dam		95·8	50	i 13 6	+ 1	e 23 24	[+ 2]	i 16 58	PP	—
Santa Clara		95·9	53	i 13 8	+ 2	i 23 27	[+ 5]	i 16 58	PP	e 50·4
Lick		96·1	53	i 13 8k	+ 1	e 23 26	[+ 3]	i 13 58	pP	—
Seattle		96·3	43	i 13 10k	+ 2	i 23 59	− 8	i 14 1	pP	—
Mineral		96·4	50	i 13 8k	0	e 23 27	[+ 2]	i 13 58	pP	—
Fresno		97·6	54	i 13 14k	0	e 23 35	[+ 4]	e 14 0	pP	—
Pasadena		98·7	57	i 13 19k	0	i 23 39	[+ 2]	i 14 6	pP	e 41·1
Tinemaha		98·8	54	i 13 20k	+ 1	e 23 41	[+ 4]	i 14 9	pP	—
Baku		99·2	310	e 13 28	+ 7	—	—	—	—	—
China Lake		99·3	55	i 13 20k	− 1	i 23 43	[+ 3]	i 14 5	pP	—
Riverside		99·4	57	i 13 22k	0	e 23 43	[+ 3]	i 14 12	pP	—
Palomar		99·8	58	i 13 24k	0	i 23 47	[+ 5]	i 14 13	pP	—
Lenkoran		100·0	308	i 13 29	+ 4	i 23 50	[+ 7]	i 17 40	PP	—
Shemakla		100·2	310	—	—	i 26 42	PS	—	—	—
Boulder City		101·5	55	i 13 32	+ 1	i 23 58	[+ 8]	e 17 38	PP	—
Hungry Horse		101·9	52	i 13 33	0	e 23 53	[+ 1]	i 17 43	PP	—
Kirovobad		101·9	311	e 13 34	+ 1	i 23 56	[+ 4]	i 17 48	PP	—
Overton	z.	101·9	54	i 13 34	+ 1	e 23 57	[+ 5]	e 14 5	pP	—
Pierce Ferry		102·2	55	i 13 35	+ 1	i 24 2	[+ 8]	i 14 26	pP	—
Grozny		102·3	313	e 13 34	− 1	i 23 59	[+ 5]	17 50	PP	—
Nakhichevan		102·7	309	i 18 3	PP	e 25 2?	+ 1	—	—	—
Butte		103·0	44	e 13 45	+ 7	i 24 0	[+ 2]	e 18 1	PP	e 43·0
Tiflis		103·1	310	e 13 39	+ 1	—	—	—	—	—
Logan		103·8	49	1 13 42	+ 1	e 23 55	[− 6]	i 17 55	PP	e 43·6
Salt Lake City		103·8	50	e 13 41	0	e 25 21	+11	e 17 46	PP	e 43·0
Bozeman		104·1	45	e 13 43	+ 1	e 25 18	+ 6	i 18 1	PP	e 42·4
Resolute Bay		104·3	14	13 41	− 2	25 14	0	17 57	PP	—
Abastumanj		104·5	311	e 13 47	+ 3	—	—	—	—	—
Tucson		104·9	58	i 13 49	+ 3	i 25 1	−18	i 14 32	pP	e 42·6
Zugdidi		105·2	312	e 13 52	+ 5	—	—	—	—	—
Moscow		106·1	326	13 51	+ 1	i 25 31	+ 2	14 36	pP	—
Pietermaritzburg	z.	108·2	237	i 18 27	PP	—	—	—	—	—
Pulkovo		108·9	331	e 14 4	P	i 25 20	SKKS	i 28 7	PS	—
Theodosia		109·5	316	e 18 45	PP	—	—	—	—	—
Rapid City	E.	109·8	46	i 14 11	P	e 26 8	SKKS	e 14 59	pP	e 45·9
Grahamstown	z.	109·9	232	i 14 13	P	i 18 15	PKP	i 18 39	PP	—
Yalta		110·5	315	e 14 2	P	e 24 26	[− 4]	e 18 50	PP	—
Ksara		110·6	303	e 14 12	P	18 45	PP	15 3	pP	—
Helsinki		111·2	333	e 14 14	P	i 26 14	SKKS	e 18 10	PKP	e 45·2
Guadalajara		111·8	70	e 17 27	?	e 27 15	sS	e 18 9	PKP	—
Lubbock		112·3	56	14 21	P	24 42	[+ 4]	18 14	PKP	—
Kimberley		113·1	235	i 14 6?	P	—	—	—	—	—
Kishinev		113·6	319	e 18 15	[0]	—	—	—	—	—
Upsala		114·6	334	e 19 16	PP	i 26 39	S	e 28 50?	PS	e 45·8
Istanbul		114·8	313	e 18 12	[− 5]	e 26 41	S	e 19 17	pPKP	—
Helwan		114·9	300	e 14 36	P	24 52	[+ 5]	15 22	pP	—
Lincoln	E.	115·2	48	e 18 47	[+29]	e 24 51	[+ 2]	e 19 19	PP	e 48·4
Lwow		115·7	323	e 18 17	[− 2]	e 26 4	SKKS	e 21 57	PPP	—
Tacubaya		115·7	72	i 18 17	[− 2]	e 24 56	[+ 6]	e 19 31	PP	—
Bucharest		116·1	317	e 19 16	PP	—	—	—	—	—
Scoresby Sund		116·2	356	i 18 20k	[0]	i 26 12	SKKS	35 7	SS	—
Puebla		116·6	72	e 19 41	PP	e 25 13	[+19]	e 29 19	SP	—
Uzhgorod		117·2	321	e 18 34	[+12]	—	—	i 22 22	PPP	—

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Skalnate Pleso		118·2	323	e 18 31	[+ 7]	e 26 5	SKKS	e 19 8	pPKP	—
Sofia		118·5	315	e 18 25	[0]	—	—	e 19 53	PP	—
Vera Cruz		118·6	72	i 19 49	PP	e 25 13	[+12]	e 29 13	SP	—
Timisoara		118·9	319	19 49?	PP	—	—	—	—	—
Raciborzu		119·1	325	e 17 50	[−36]	e 25 28	[+25]	e 19 53	PP	—
Copenhagen		119·2	332	i 18 27	[+ 1]	27 23	SKKS	29 39	SKSP	—
Bergen	E.	119·2	339	—	—	e 39 54?	SSS	—	—	49·5
Budapest		119·7	322	19 28	[+61]	i 27 30	SKKS	e 19 44	PP	e 58·3
Belgrade		119·8	318	e 20 12	PP	e 36 13	SS	e 22 54	PPP	e 61·9
Ogyalla		120·0	322	e 20 11	PP	e 27 36	SKKS	e 20 34	pPP	—
Kalossa	E.	120·1	321	e 19 3	[+35]	e 29 46	PS	e 19 58	PP	—
St. Louis		120·6	49	i 14 57	P	i 25 9	[+ 1]	i 18 29	PKP	—
Prague		121·2	326	e 18 33	[+ 3]	e 25 34	[+25]	e 18 57	pPKP	e 50·8
Collmberg		121·4	327	e 18 31	[+ 1]	e 28 7	SKKS	e 19 25	pPKP	e 48·3
Chicago		121·5	44	e 18 32	[+ 1]	i 25 12	[+ 1]	i 20 4	PP	e 50·6
Cheb		122·3	327	e 20 16	PP	e 27 58	S	e 20 57	pPP	—
Jena		122·3	328	e 18 34	[+ 2]	e 36 39	SS	e 19 58	PP	—
Taranto		123·6	315	18 41	[+ 6]	27 51	S	20 31	PP	—
Triest		123·8	322	i 18 35	[0]	i 28 6	S	e 19 28	pPKP	—
Cincinnati		124·6	46	i 18 36	[− 1]	i 20 23	PP	i 19 25	pPKP	—
Merida		124·6	69	e 20 13	PP	e 30 4	PS	—	—	—
De Bilt		124·8	332	i 20 34	PP	i 37 18	SS	i 23 18	PPP	e 50·8
Stuttgart		124·8	327	i 18 38k	[+ 1]	e 36 25	SS	e 19 31	sPKP	e 57·8
Karlsruhe		125·1	328	i 18 41	[+ 3]	—	—	i 20 33	PP	—
Padova		125·5	322	e 19 28	pPKP	e 28 24	S	e 21 22	pPP	—
Chur		125·7	325	e 18 40	[+ 1]	—	—	—	—	—
Messina		125·7	313	i 18 39	[0]	e 30 42	PS	i 19 26	pPKP	—
Strasbourg		125·7	328	i 18 40a	[+ 1]	e 30 48	PS	e 20 37	PP	e 50·8
Bologna		125·8	322	e 18 42	[+ 3]	e 28 28	S	e 21 3	PP	—
Cleveland		125·8	43	e 18 39	[0]	e 25 22	[− 2]	i 19 31	pPKP	—
Salo	Z.	125·8	323	e 18 40k	[+ 1]	e 22 3	PKS	e 20 41	PP	—
Zürich		125·9	326	i 18 39a	[0]	e 20 30	PP	e 19 25	pPKP	—
Prato		126·3	321	e 18 40	[0]	i 28 28	S	—	—	—
Rome		126·3	318	i 18 40k	[0]	e 28 29	S	e 19 25	pPKP	—
Basle		126·4	326	e 18 40	[0]	—	—	e 20 39	PP	—
Pavia		126·8	323	i 18 43	[+ 2]	i 28 35	S	e 20 42	PP	e 58·5
Buffalo		126·9	40	i 18 42	[+ 1]	i 21 43	SKP	i 20 41	PP	—
Neuchatel		127·1	326	e 18 42	[+ 1]	—	—	—	—	—
Pittsburg		127·3	43	i 18 43	[+ 1]	i 25 32	[+ 4]	i 20 34	PP	—
Besançon		127·4	327	e 18 43	[+ 1]	e 22 27	PKS	e 19 59	sPKP	—
New Kensington	E.	127·4	43	i 20 41	PP	e 25 29	[0]	i 22 2	PKS	e 63·4
Ottawa		127·5	36	i 18 42	[0]	i 25 31	[+ 2]	i 20 43	PP	—
Morgantown		127·7	44	i 18 43	[0]	—	—	e 19 21	pPKP	—
Kew		127·8	334	i 18 44a	[+ 1]	i 22 3	PKS	e 20 39	PP	e 52·8
Paris		128·3	330	i 18 45	[+ 1]	i 28 46	S	i 20 25	sPKP	e 60·8
Pennsylvania		128·5	42	i 18 46	[+ 2]	i 25 37	[+ 5]	i 20 49	PP	—
Shawinigan Falls	N.	128·5	33	18 44	[0]	25 33	[+ 1]	20 31	PP	—
Rathfarnham Castle		128·7	339	i 18 46	[+ 1]	e 38 29	SS	e 20 44	PP	—
Columbia		129·1	51	i 18 47	[+ 2]	e 25 33	[0]	i 20 52	PP	e 53·1
Seven Falls	E.	129·2	31	18 45	[0]	25 35	[+ 1]	20 53	PP	52·4
Washington	Z.	130·0	43	i 18 49	[+ 2]	i 21 53	PKS	i 19 34	pPKP	—
Palisades		131·0	40	i 18 50	[+ 1]	i 25 42	[+ 4]	i 21 7	PP	e 60·8
Fordham		131·1	40	i 18 51	[+ 2]	i 21 57	PKS	i 21 9	PP	—
Harvard		131·6	37	i 18 51	[+ 1]	e 25 44	[+ 4]	e 19 34	pPKP	—
Weston		131·9	37	i 18 51	[0]	i 22 0	PKS	i 21 10	PP	—
Tortosa		134·5	323	19 10	[+15]	28 8	SKKS	21 29	PP	e 62·8
Halifax		134·6	29	18 58	[+ 2]	28 30	SKKS	21 30	PP	—
Huancayo		134·7	115	e 18 44	[−12]	i 27 36	SKKS	i 19 1	pPKP	e 66·8
Balboa Heights		134·9	84	i 19 0	[+ 4]	e 22 29	PKS	e 21 34	PP	—
Algiers Univ.	Z.	135·2	317	e 18 57	[0]	e 22 2	PKS	e 19 53	pPKP	—
Alicante		136·6	322	e 18 52	[− 7]	25 54	[+ 5]	24 32	PPP	e 62·0
Toledo		137·8	325	e 19 31	[+29]	e 39 53	SS	e 21 56	PP	62·5
Chinchina		138·6	89	i 18 49	[−14]	e 28 30	SKKS	e 22 19	PKS	—
Almeria		138·7	321	i 19 4	[+ 1]	26 18	[+25]	22 2	PP	66·1
La Paz		138·9	125	i 19 1	[− 3]	i 28 39	SKKS	i 19 29	pPKP	66·8

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m.	s.		m.
Tamanrasset	z.	138·9	297	i 18 57	[− 7]	e 30 55	SKSP	i 19	55	pPKP	e 63·7
Granada		139·2	322	19 9k	[+ 5]	25 39	[−14]	19	24	pPKP	i 65·8
Malaga		140·0	322	i 18 57	[− 8]	i 25 57	[+ 2]	i 22	3	PP	e 77·8
Bogota		140·1	91	i 18 59	[− 7]	e 28 42	SKKS	i 22	5	PP	65·8
Lisbon		141·4	329	19 3k	[− 5]	23 13	PKS	i 22	14	PP	66·8
San Juan		146·8	67	i 19 18	[+ 1]	i 29 20	SKKS	i 20	10	pPKP	—
Fort de France		152·3	72	i 19 27	[+ 1]	i 29 51	SKKS	—		—	—

Additional readings :—
Riverview iNZ = 5m.30s., iZ = 6m.12s., iN = 9m.53s., iZ = 10m.6s., iN = 10m.14s., isSE = 10m.50s., iE = 11m.9s. and 11m.21s.
Manila isSEN = 11m.56s., eSSEN = 13m.18s.
Perth PPP = 8m.24s., SS = 15m.4s.
Auckland iScSN = 17m.0s.
Apia ScS?EN = 17m.5s.
Owase SS?EN = ScS? = 16m.57s.
Koti ePcP = 9m.19s., ePcS = 13m.17s., eSS = 16m.57s.
Misima iN = 17m.20s.
Wellington isS = 14m.52s., eScS = 17m.9s.
Osaka eZ = 8m.22s.
Kobe eN = 7m.46s., eScS?E = 17m.21s.
Tokyo iE = 8m.28s., iEN = 13m.49s.
Hukuoka i = 8m.2s., iE = 9m.22s., iEN = 9m.29s., i = 13m.23s.
Christchurch iScSEN = 17m.25s., eQEN = 17m.59s.
Matusiro ScS? = 17m.31s.
Toyama pPP? = 10m.34s., ScS = 17m.35s.
Zi-ka-wei PcPZ = 9m.30s., PPZ = 9m.44s., iZ = 16m.37s., iSSZ = 17m.36s.
Nanking iEN = 9m.16s., iPP? = iPcP? = 10m.0s., isS = 16m.16s., i = 16m.45s., iSS?EN = 17m.50s.
Vladivostok isS = 17m.3s.
Honolulu i = 10m.18s., isP = 11m.6s., ePP = 12m.16s., esS = 19m.21s., i = 23m.20s.
Klyuchi isS = 19m.51s.
Chatra PPEZ = 12m.42s., PSE = 19m.23s., PSZ = 19m.29s., PPSE = 19m.38s., SKSEZ = 20m.8s., P'P'EZ = 38m.56s.
Kodaikanal PSE = 20m.18s., PPSE = 20m.33s., SSE = 24m.15s., QE = 28m.29s.
Hyderabad SSN = 24m.27s.
New Delhi PSEN = 21m.15s., iEN = 21m.39s., iN = 21m.59s., iSSN = 25m.18s., SSSN = 28m.19s., QN = 29m.52s.
Poona PPN = 14m.2s., PPPN = 15m.44s., PSEN = 21m.18s., PPSEN = 21m.35s., SSEN = 25m.34s., SSSEN = 28m.46s.
Almata sS = 23m.0s.
Rybach'e isS = 23m.2s.
Frunse isS = 23m.13s.
Andijan sS = 23m.17s.
Tashkent isS = 23m.45s.
College i = 12m.48s., ePP = 15m.40s., ipPP = 16m.43s., iPPP = 17m.42s., iS = 22m.24s., esS = 24m.0s., eSS? = 27m.57s., ePKKP = 30m.17s., eSSS? = 33m.17s., ePKP,PKP = 38m.8s., ePKP,PKP,PKP? = 56m.3s.
Sitka isS = 23m.12s., iPS = 24m.6s., iSS? = 29m.54s.
Sverdlovsk iPP = 16m.42s., isS = 24m.59s., iSS = 29m.55s.
Arcata eZ = 13m.39s. and 14m.8s.
Ukiah iSKS = 23m.24s., eS? = 24m.29s., ePS = 25m.25s., eSS = 30m.33s.
Victoria e = 25m.11s., PS = 26m.28s.
Berkeley iZ = 13m.50s., eZ = 14m.8s., iPPZ = 16m.56s., iZ = 17m.7s., iN = 24m.16s., iPSE = 25m.31s.
Tananarive PPP = 19m.6s., eSKS = 23m.24s., SS = 30m.50s.
Shasta Dam eS = 24m.11s.
Lick ePPN = 16m.59s., iZ = 17m.3s., iPKKP?Z = 29m.55s., eZ = 30m.27s.
Seattle isP = 14m.19s., iPP = 17m.11s., ipPP = 18m.0s., isPP = 18m.51s.?, iPPP = 19m.21s., iSKS = 23m.30s., iPKKP = 29m.14s., iSS = 30m.14s., isSS = 31m.31s., and many unidentified readings.
Mineral iZ = 13m.14s., eZ = 15m.55s., iPPZ = 17m.3s., iPKKP?Z = 29m.54s., iZ = 30m.7s., eZ = 30m.23s.
Fresno eZ = 13m.47s., 14m.27s., and 15m.51s., ePPNZ = 17m.12s., eE = 19m.29s.
Pasadena esPZ = 14m.35s., iPPEZ = 17m.17s., iPP = 17m.21s., eEZ = 25m.55s., ePKP, PKPZ = 37m.59s.
China Lake isPZ = 14m.30s., iPPZ = 17m.17s., ePKP,PKPZ = 37m.46s.
Riverside ePKP,PKPZ = 37m.51s.
Palomar iPPEZ = 17m.25s.
Boulder City ePKP,PKP = 37m.46s.
Hungry Horse ePKP = 17m.15s., ePKKP = 29m.35s., iPKKP = 30m.0s., ePKP,PKP = 37m.56s.
Kirovobad iSS = 31m.55s.
Overton iZ = 16m.44s., ePPSZ = 27m.43s., ePKP,PKPZ = 39m.53s.
Pierce Ferry i = 16m.40s., iPP = 17m.42s., ePKP,PKP = 37m.41s.

Continued on next page.

Grozny iSS =32m.19s.
Butte eSS =32m.24s., eSSS =37m.29s.
Logan iSKS =24m.4s., iPS =26m.56s., eSS =32m.3s., ePKP,PKP =37m.59s.
Salt Lake City iSKS =24m.5s., ePS =26m.53s., ePPS? =29m.8s.
Bozeman iSKKS =24m.7s., ePS =26m.58s., eSS? =31m.23s.
Resolute Bay eZ =14m.22s., e =16m.39s., SKS =24m.0s., e =27m.7s., SS =32m.40s.
Tucson iPP =18m.2s., eSKS =24m.3s., eSKKS =24m.35s., iPS =27m.9s., ePPS = 28m.8s., iPKKP? =28m.49s., eSS? =31m.41s., ePKP,PKP =37m.31s., i =40m.14s.
Moscow ePP =18m.9s., ePS =27m.15s.
Rapid City ePKPE =17m.53s., iPPE =18m.46s., eSKSE =24m.27s., iSKKS?E = 25m.29s., iPSE =27m.58s., iPPSE =29m.12s., eSSE =33m.55s., eSSSE =38m.33s.
Yalta ePS =28m.25s.
Helsinki ePPEZ =18m.56s., eSPE =28m.12s., iPSE =28m.27s., eE =29m.41s., eN = 33m.3s., iSSN =34m.9s.
Guadalajara e =20m.10s., eSP =28m.18s.
Lubbock PPP? =18m.59s.
Kimberley i =12m.56s.?.
Upsala eN =21m.4s., e =28m.1s., ePPS =30m.15s., eE =30m.55s., eSS =34m.49s., eE =37m.9s., eN =37m.57s., eE =38m.17s. and 42m.34s.
Istanbul esPKPZ =19m.33s., iPPZ =20m.22s., eZ =29m.37s., eNZ =30m.5s.
Helwan PKPZ =18m.26s., PPEZ =19m.19s., eE =26m.2s., PSE =28m.58s., PPS?E = 30m.7s.
Lincoln eSKKS?E =26m.6s., eE =27m.57s., ePSE =28m.51s., eSSE =35m.13s.
Tacubaya e =23m.56s., iPS =29m.4s.
Bucharest eN =19m.23s., eE =19m.34s.
Scoresby Sund i =19m.18s.
Puebla e =19m.52s. and 22m.1s.
Skalnate Pleso ePP =19m.49s., eS =27m.20s., esSN =28m.12s., eSP =29m.18s., eSPP = 30m.26s., eSS =35m.25s. and other unidentified e readings.
Vera Cruz i =19m.56s.
Raciborzu eZ =20m.41s., eEN =22m.38s.
Copenhagen 19m.53s. and 22m.24s., SS =36m.0s.
Budapest ePPPN =22m.27s., ePPPE =22m.33s., eN =29m.29s., ePSE =29m.49s., eN =32m.9s. and 39m.23s., SSSE =40m.35s.
Belgrade eNW =21m.42s., 27m.32s., and 29m.23s., eSSSNW =41m.14s., eNE =43m.11s.
Ogyalla ePPP =22m.40s., eSE =27m.39s., esSN =28m.28s., eSSE =35m.49s., eSSN =36m.13s., and other unidentified e readings.
Kalossa eN =19m.6s. and 20m.29s.
St. Louis iPP =19m.56s., iSKKS? =26m.41s., i =29m.41s.
Prague esPKP =19m.13s., e =19m.24s., ePP =20m.3s., ipPPN? =20m.18s., esPP = 20m.43s., eZ =21m.5s., e =21m.15s. and 23m.12s., eSKKS =26m.20s., eN = 27m.29s., eSP =29m.33s., eSPP =30m.55s., ePPS =31m.11s., eSS =36m.29s., eSSS =40m.41s.
Collmberg eP?Z =15m.2s., eE =20m.7s., eZ =20m.10s., eN =20m.27s., ePPS?Z = 32m.14s., eN =32m.27s. and 34m.21s., eZ =36m.3s., eE =36m.27s., eN =36m.31s., eZ =36m.43s.
Chicago ePPP =22m.38s., eSKKS? =26m.30s., eSKSP =29m.28s., iPS =29m.49s., iPPS =31m.21s., eSS? =36m.20s., eSSS =41m.46s.
Cheb eN =21m.29s., 21m.51s., 22m.8s., 23m.8s., 26m.54s., and 29m.25s., eSP =29m.49s., ePPS =31m.30s., eN =33m.7s. and 34m.54s., e =35m.51s., eSS =36m.31s.
Jena eN =19m.25s., ePPN =20m.12s., eN =21m.1s., 21m.15s., 22m.33s., and 22m.38s.
Triest iPP =20m.21s., isS? =29m.18s., eSPZ =30m.48s., eSPPZ =32m.8s., iSS = 36m.55s., eSSS =41m.46s.
Stuttgart eZ =18m.23s.?, ePPZ =19m.56s., iZ =20m.29s., eZ =20m.36s. and 20m.44s., e =21m.51s., ePPP =23m.4s., ePKKP =28m.15s., eZ =28m.20s., eSS =37m.9s., e =40m.4s., eSSS =41m.37s., e =52m.49s.
Messina iPPZ =20m.29s.
Strasbourg e =19m.34s., 19m.57s., and 20m.28s., ePPP =23m.24s., e =24m.13s., 28m.22s., and 33m.32s., eSS =37m.32s., ePSS =38m.35s., e =40m.9s.
Cleveland iPPN =20m.31s., iSKPN =21m.56s., eSKSE =25m.26s., esSKSE =26m.51s., eSKKSE =27m.9s., iPSE =30m.33s., epPSE =31m.27s., ePPSE =31m.51s., eN = 32m.28s., eSS?E =37m.22s.
Rome iPP =20m.40s., eN =29m.17s., PS? =30m.23s., SS =36m.57s.
Pavia eSKP? =21m.41s., e =33m.2s., eSS =36m.51s., e =39m.31s.
Buffalo i =21m.59s., eSP =30m.25s.
Pittsburg e =22m.1s., i =27m.22s. and 30m.46s.
Besançon e =19m.6s. and 20m.29s., ePP =20m.53s., e =21m.0s., epPP =21m.45s., e =22m.53s. and 25m.9s.
New Kensington ePPP?E =23m.12s., eSKKS?E =26m.59s.
Ottawa e =18m.33s. and 21m.43s., PKS? =21m.59s., e =23m.32s., iSKKS =27m.23s., e =32m.25s., iSS =37m.45s.
Kew ePKKP?EN(△ >180°) =28m.37s., eSSEN =37m.57s., eSKSP?EN(△ >180°) = 40m.15s., eSSSEN =42m.17s.
Paris e =18m.35s., isPKP? =20m.25s., iPP =20m.55s., iPKS =22m.10s., iPS =31m.14s., ipSP? =22m.21s., iPPS =32m.36s., iSS =37m.51s. and 38m.0s., iPSS =39m.35s., isSS? =40m.10s., iSSS =42m.24s., and other unidentified i readings.
Pennsylvania iPKSEN =22m.5s., ipPKS?E =22m.20s., iEN =23m.11s., iE =27m.22s.
Shawinigan Falls eN =22m.4s., PPPN =23m.33s., SKKSN =27m.28s.

Continued on next page.

Rathfarnham Castle eZ =19m.31s., e =24m.7s., 31m.35s., and 32m.0s.
Columbia iPKS =22m.10s., eSKKS? =27m.34s., ePS? =31m.7s., iSS =38m.9s., eSSS? = 41m.54s.
Seven Falls PKSE =22m.8s., eE =23m.3s., SKKSE =27m.33s., PSE =31m.0s., SSE = 38m.0s., eE =40m.27s.
Washington iPPZ =20m.57s., ePSZ =31m.6s.
Palisades e =18m.38s., i =19m.37s., 21m.52s., and 21m.57s., iPKS =22m.16s., iSKKS = 27m.45s., ePS =31m.7s., ePPS =32m.56s., eSS =38m.27s.
Fordham e =18m.12s., i =19m.38s., iSSS =40m.39s.
Harvard i =18m.33s., e =21m.0s., iPP =21m.9s., isPP =21m.59s., iPKS =22m.18s., ipPKS =22m.49s., isPKS =23m.9s., e =23m.22s., ePPP =24m.9s., ipPPP = 24m.36s., eSKKS =27m.40s., e =28m.42s., eSKSP =30m.58s., eSP =31m.11s., ePS =31m.24s., i =31m.29s., esPS =31m.54s., eSSP =32m.37s., iPPS =33m.7s., i =35m.5s., e =38m.7s., eSS =38m.29s., esSS =38m.59s., ePKP,PKP =40m.8s.
Weston e =18m.41s., iSKKP =31m.14s.
Tortosa iE =29m.35s.
Halifax PKS =22m.28s., PS =31m.32s., SS =38m.49s.?.
Huancayo ePP =21m.25s., i =21m.37s., e =22m.16s. and 28m.15s., iSS =39m.15s.
Algiers Univ. eZ =19m.45s. and 21m.11s., ePPZ =21m.37s., epPPZ =22m.18s., ePPP?Z = 24m.5s., eSKKSZ =27m.44s.
Alicante i =22m.28s., PS =31m.18s., SS =38m.26s., SSS =43m.2s., Q =54m.32s.
Toledo i =20m.4s., e =22m.39s. and 41m.9s.
Chinchina iZ =19m.1s.
Almeria PPP =25m.10s., SS =40m.42s.
La Paz isPKP =20m.16s., iPP =22m.13s., ipPP =22m.43s., iPS =31m.49s., iSS = 40m.7s., iSSP =41m.9s.
Tamanrasset Z =17m.57s., iZ =19m.3s. and 19m.10s., iPPZ =21m.45s., iZ =21m.59s., ipPPZ =22m.42s., isPPZ =23m.3s., ePPSZ =34m.3s., Z =55m.13s.
Granada iPP =22m.24s., eSKKS =27m.48s., PPS =35m.6s., SS =40m.18s., SSS = 43m.40s.
Malaga SKKS =28m.55s.
Bcgota iPKP,EN =19m.12s., iSKP =22m.42s., eEN =23m.48s.
Lisbon Z =19m.53s. and 21m.58s., SSEN =40m.31s., E =49m.49s.?.
San Juan iPP =22m.41s.

Feb. 17d. Readings alsc at 0h. (Apia (2), Almata II, near Chilisk (2), Ili, Kurmenty, and near Krasnogorka), 1h. (Apia, near Chilisk, Ili, Krasnorgoka, and Kurmenty), 2h. (Ashkabad, Almata II, near Chilisk (2), Ili (2), Krasnogorka, Kulyab, Kurmenty (3), Chatra, near New Delhi, Tucson, Overton, and near College), 3h. (Tchimkent, near Fergana, Khorog, Kulyab, and Lunacharskoe), 4h. (College), 5h. (Tucson, Boulder City, Pierce Ferry, Mineral, and College), 6h. (Ashkabad, Pierce Ferry, and near Kurmenty), 7h. (near Kurmenty), 9h. (Chatra, Fergana, near Andijan (2), Khorog, Kulyab, and near Athens), 11h. (China Lake, Tinemaha, Tucson (2), Boulder City, Overton, Pierce Ferry, College (2), Ashkabad, Sverdlovsk, Almata II (2), Andijan, Fergana, Krasnogorka, Kulyab, near Almata, Ili (2), Kurmenty (2), Frunse, and Rybach'e), 13h. (Kimberley), 14h. (Almata II, Krasnogorka, near Kurmenty, near Bandcng, and Djakarta), 15h. (near Khorog), 16h. (Ashkabad), 17h. (Ashkabad, Tucson, near Chilisk, and Kurmenty), 19h. (Strasbourg, Wellington, near Kurmenty, and near Manila), 21h. (Mount Wilson, Pasadena, Palomar, Riverside, China Lake, Victoria, Stuttgart, Chilisk, near Krasnogorka, Kurmenty, and near Apia), 22g. (Overton, Pierce Ferry, Tamanrasset, near Almata II, Chilisk (2), Ili (2), Krasnogorka (2), and Kurmenty (2)), 23h. (Andijan, Fergana, near Khorog, and Kulyab).

Feb. 18d. 7h. 9m. 47s. Epicentre 1°·5N. 82°·2W.

A = +·1357, B = −·9904, C = +·0260 ; δ = −2 ; h = +7 ;
D = −·991, E = −·136 ; G = +·004, H = −·026. K = −1·000.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chinchina	7·4	62	i 1 49	− 3	i 3 18	0	—	—	—
Balboa Heights	7·8	19	i 2 0	+ 2	i 3 28	0	—	—	—
Bogota	8·7	69	i 2 11	+ 1	i 3 57	+ 7	i 2 21	PP	—
Huancayo	15·1	153	i 3 32	− 4	e 6 40	+15	—	—	—
La Paz	22·6	141	i 5 6	+ 3	9 15	+ 8	i 5 30	PP	12·2
San Juan	23·0	42	i 5 8	+ 1	—	—	—	—	—
St. Louis	37·7	350	e 7 19	0	—	—	—	—	—
Florissant	37·9	350	e 7 20	0	—	—	—	—	—
Tucson	40·8	322	i 7 44	− 1	—	—	—	—	—
Pierce Ferry	45·3	324	i 8 21	0	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Boulder City		45·7	323	e 8 24	0	—	—	—	—	—
Overton	z.	45·9	324	e 8 30	+ 4	—	—	—	—	—
Riverside	z.	46·1	319	e 8 26	− 2	—	—	—	—	—
Pasadena	z.	46·7	319	e 8 32	0	—	—	—	—	—
China Lake	z.	47·4	321	e 8 34	− 4	—	—	—	—	—
Lick	z.	50·9	320	e 9 3k	− 2	—	—	—	—	—
Mineral	z.	52·6	323	e 9 19k	+ 1	—	—	—	—	—
Hungry Horse		54·1	335	i 9 28	− 1	—	—	—	—	—
College		78·5	337	e 12 3	− 1	—	—	—	—	—

Additional readings :—
Tucson e = 8m.11s.
Mineral iZ = 9m.35s.

Feb. 18d. Readings also at 0h. (College, Almata II, Krasnogorka, near Chilisk, Ili, Kurmenty and near New Delhi), 1h. (Ili and near Kurmenty), 2h. (Brisbane, Lick, Hungry Horse, College, Ashkabad, and near Athens), 4h. (Shemakla), 5h. (Saskatoon), 6h. (Ksara), 7h. (near Huancayo), 9h. (Fergana, Kulyab, Tchimkent, near Almata, Almata II (2), Andijan, Chilisk (2), Frunse, Ili (2), Krasnogorka (2), Kurmenty (2), Naryn (2), Rybach'e, and near Tacubaya), 10h. (La Paz, near Huancayo, Almata II near Chilisk, Ili, and Kurmenty), 11h. (Tucson, China Lake, and College), 12h. (near Kabansk), 13h. (Apia), 14h. (Andijan, Fergana, Lunacharskoe, Samarkand, Tashkent, Tchimkent, near Khorog, and Kulyab), 15h. (near Ottawa and near Yuzno-Sakhlinsk), 16h. (Huancayo, near Bogota, Chinchina, near Akhalkalaki, Gandzha, and Tsikhlis-Dzhvari), 17h. (La Paz, near Bogota (2), and Chinchina (2)), 18h. (Apia, Huancayo, La Paz, near Bogota (3), Chinchina (2), and College), 19h. (College), 20h. (Chilisk, Khorog, near Almata II, Frunse, Ili, Krasnogorka, Kurmenty, near Kulyab, and Samarkand), 21h. (near Bogota (2), Chinchina, Hungry Horse, College (2), Andijan, Ili, Kurmenty, and near Khorog), 22h. (Andijan, Khorog, Krasnogorka, near Fergana, Kulyab, and Tchimkent), 23h. (Bogota, Huancayo, La Paz, Hungry Horse, College, Tamanrasset, Almeria, Paris, and Ksara).

Feb. 19d. 17h. 43m. 52s. Epicentre 17°·8S. 178°·8W. Depth of focus 0·080.
(as on 1950, Oct. 10d.).

$A = -·9526$, $B = -·0199$, $C = -·3038$; $\delta = +14$; $h = +5$;
$D = -·021$, $E = +1·000$; $G = +·304$, $H = +·006$, $K = -·953$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Apia		7·9	60	i 1 56	− 1	—	—
Kaimata	N.E.	26·0	197	e 4 8?	−43	—	—
Brisbane	z.	27·7	245	i 5 7k	+ 1	—	—
Berkeley	z.	76·7	44	e 10 57	0	e 12 56	pP
Lick	z.	76·8	43	i 10 57a	0	e 13 3	pP
Pasadena	z.	77·4	48	i 11 0a	0	e 13 0	pP
Fresno	z.	77·7	45	e 11 2a	0	e 12 41	pP
Palomar		77·9	50	i 11 3a	0	i 13 1	pP
Riverside	z.	77·9	48	i 11 2	− 1	e 13 1	pP
Shasta Dam		78·3	41	i 11 4	− 1	—	—
Mineral	z.	78·6	42	i 11 7k	0	i 13 7	pP
China Lake	z.	78·7	47	i 11 8a	+ 1	i 13 7	pP
Tinemaha	z.	78·9	45	e 11 10	+ 2	e 13 11	pP
Reno		79·2	43	e 11 12k	+ 2	e 13 10	pP
Boulder City		80·7	48	i 11 18	0	i 13 19	pP
Overton	z.	81·3	47	i 11 21	0	i 13 23	pP
Pierce Ferry		81·4	48	i 11 22	+ 1	i 13 23	pP
Tucson		81·9	52	i 11 24	0	e 13 23	pP
Logan		85·6	43	e 11 41	− 1	e 13 44	pP
College		85·7	12	i 11 41	− 2	e 13 44	pP
Hungry Horse		87·4	37	i 11 49	− 2	e 13 54	pP
Stuttgart	z.	148·4	352	e 18 46	[+ 5]	—	—

Additional readings :—
Mineral iP_cPZ = 11m.12s.
Hungry Horse ePP = 15m.21s.

Feb. 19d. 22h. 11m. 54s. Epicentre 24°·8S. 116°·5W.

J.S.A. give epicentre as adopted.

$A = -·4055$, $B = -·8133$, $C = -·4172$; $\delta = -6$; $h = +4$;
$D = -·895$, $E = +·446$; $G = +·186$, $H = +·373$, $K = -·909$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		40·9	80	e 7 44	− 2	e 13 56	− 2	—	—	e 17·5
La Paz		45·8	89	i 8 27	+ 2	i 15 9	0	i 20 6	SSS	21·9
Tacubaya		47·1	23	e 8 53	+18	e 18 57	SS	—	—	e 22·2
Vera Cruz		48·0	27	—	—	e 19 13	SS	—	—	e 21·6
Chinchina		49·6	58	e 8 41	−14	e 16 9	+ 6	—	—	e 21·3
Bogota		50·6	60	i 9 3	+ 1	i 16 19	+ 2	—	—	e 25·4
Tucson		57·0	7	e 9 49	− 1	17 55	+12	e 11 57	PP	e 26·6
Palomar	z.	57·8	0	i 9 55	0	—	—	—	—	—
Riverside	z.	58·5	359	i 10 0	0	—	—	—	—	—
Wellington		58·5	235	—	—	e 18 6	+ 3	e 24 6?	Q	e 26·8
Pasadena		58·6	359	i 10 0	− 1	e 18 9	+ 5	i 10 16	?	e 27·4
Lubbock		59·7	15	10 8	− 1	—	—	—	—	—
Christchurch		59·8	232	—	—	e 18 25	+ 5	24 51	SSS	27·6
China Lake	z.	60·3	0	e 10 11	− 2	—	—	—	—	—
Boulder City		60·5	2	e 10 14	0	e 18 41	PS	—	—	—
Pierce Ferry		60·6	3	i 10 16	+ 1	—	—	—	—	—
Overton	z.	61·0	2	e 10 18	0	—	—	—	—	—
Fresno	z.	61·3	358	e 10 18	− 2	e 19 30	+51	e 12 44	PP	e 29·6
Tinemaha	z.	61·5	359	e 10 22	+ 1	—	—	—	—	—
Lick	z.	62·0	356	i 10 25k	+ 1	—	—	i 10 34	?	—
Berkeley		62·6	356	e 10 29	+ 1	e 19 20	PS	e 11 9	PcP	e 29·5
Reno	z.	64·1	358	e 10 40k	+ 2	—	—	e 12 46	PP	—
Mineral		65·0	356	e 10 45k	+ 1	—	—	i 13 5	PP	—
Salt Lake City		65·4	5	e 11 9	+22	e 19 29	− 1	e 13 38	PP	e 28·8
Shasta Dam		65·4	356	e 10 47	0	—	—	—	—	—
Logan		66·4	5	e 10 52	− 1	e 20 54	PPS	e 24 11	SS	e 32·8
St. Louis		67·7	22	e 11 1	0	e 20 7	+ 9	—	—	—
Rapid City	E.	69·6	12	e 11 15	+ 2	e 20 26	+ 5	e 13 58	PP	e 32·6
Morgantown		72·6	29	i 11 30	− 1	—	—	i 11 38	P	—
Hungry Horse		72·8	3	i 11 32	0	—	—	—	—	—
Victoria		73·2	356	e 11 35	0	—	—	—	—	31·1
Washington	z.	73·3	32	e 11 42	+ 7	—	—	—	—	—
Cleveland		73·5	27	e 11 35k	− 1	i 21 10	+ 4	e 25 59	SS	—
Palisades		76·5	32	i 11 52	− 2	i 21 43	+ 4	—	—	e 32·4
Harvard		78·8	33	e 12 12	+ 6	—	—	—	—	e 40·6
Weston		78·8	33	e 12 12	+ 6	e 22 7	+ 3	—	—	—
Ottawa		79·1	28	e 12 7	− 1	e 22 6	− 1	e 27 14	SS	e 33·4
Seven Falls	E.	82·6	29	—	—	i 22 46	+ 3	—	—	—
College		92·6	347	e 13 12	− 3	e 25 38	PS	—	—	e 38·2
Tamanrasset	z.	127·3	79	e 19 6	[− 1]	—	—	e 21 8	PP	—
Stuttgart		131·6	46	e 19 16?	[+ 1]	—	—	—	—	e 74·1
Copenhagen		131·9	36	—	—	39 21	SS	—	—	72·1
Istanbul	z.	147·1	52	e 19 44	[+ 1]	—	—	e 20 12	pPKP	—
Helwan	z.	151·0	73	e 19 58	[+ 9]	—	—	—	—	—
Ksara		154·4	63	i 20 16	PKP_2	—	—	—	—	—
Bombay		169·5	238	e 22 6?	?	—	—	—	—	—

Additional readings :—
La Paz SS = 18m.42s.
Tucson i = 10m.26s., eP_cP = 10m.54s., eSS = 21m.45s.
Christchurch eN = 20m.1s., eE = 22m.44s.
Rapid City eSS?E = 25m.48s.
Cleveland iPN = 11m.43s.
Helwan eZ = 20m.25s. and 20m.45s.
Long waves were also recorded at Puebla, Saskatoon, Seattle, Santa Clara, Resolute Bay, Rathfarnham Castle, Kew, Paris, De Bilt, Prague, Rome, Alicante, Granada, Almeria, and Kodaikanal.

Feb. 19d. Readings also at 0h. (Taranto and near Messina), 3h. (near Chilisk, Ili, Kurmenty, Kaimata, near Apia (2), Wellington, College, Mount Wilson, China Lake, Tinemaha, Lick, Fresno, Mineral, Reno. Boulder City, Overton, Logan, Tucson, Hungry Horse, Tamanrasset, Collmberg, and Stuttgart), 5h. (College, Chilisk, near Krasnogorka, and Kurmenty), 6h. (Tamanrasset), 7h. (Grahamstown, Almata II, Krasnogorka, near Chilisk, Ili, and Kurmenty), 8h. (Andijan), 9h. (Ili, near Chilisk, Kurmenty, Oaxaca, Puebla, Tacubaya, Vera Cruz, Tucson, Boulder City, Overton, Pierce Ferry and Tinemaha), 10h. (Christchurch, Cobb River, Kaimata, Tuai, Wellington, Fresno, Mineral, Reno, Mount Wilson, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, College, and Tamanrasset), 11h. (Chatra, Dzhergetal, near Khorog, and Kulyab), 12h. (Pretoria, College, Tinemaha, Hungry Horse, Tucson, Pierce Ferry, Overton, and near Alicante), 13h. (near Apia), 15h. (near Tananarive, and near Zürich), 16h. (Prague), 17h. (Pretoria, Ashkabad, and near Khorog), 18h. (Tacubaya and near Ashkabad (2)), 19h. (near Chilisk, Ili, Kurmenty, near Bogota, and Chinchina), 20h. (Budapest, Kalossa, Jena, Ogyalla, Raciborzu, Prague, near Skalnate Pleso, Stuttgart, near Chilisk, Ili, and Kurmenty), 21h. (Bombay and Ottawa), 22h. (Boulder City, Pierce Ferry, Overton, near Santa Clara, and near Istanbul), 23h. (La Paz).

Feb. 20d. 0h. 14m. 8s. Epicentre 48°·0N. 19°·2E.

Intensity VII at Djosjeno, Ersekradkert, Tereske, and Tolmacs (damaged buildings); VI-VII at Patak, Retsag, Szatok, Szente; VI at Detjar, Nagybörzsony, Nograd, Romhany; IV at Budapest and throughout Austria; III at Villach.

Macroseismic epicentre 47°56′N. 19°11′E.
Microseismic epicentre 47°59′N. 19°16′E.

V. Karnik.
The Earthquake of Nograd, Feb. 20d., 1951.
Traveaux de l'Institut de Géophysique de l'Académie tchécoslovaque des Sciences, 1953, No. 2, pp. 17-40, with macroseismic chart p.18.

Turi Istvan.
Ungarischer Erdbebenkatalog für das Jahr, 1951.

Makroseismische Beobachtungen, 1951. Jahrbücher der Zeutralanstalt für Meteorologie und Geodynamik. Jahrgang, 1951. Neue Folge, Vol. 88, Vienna, 1952, p.E.1.

$A = +·6342$, $B = +·2209$, $C = +·7409$; $\delta = -6$; $h = -5$;
$D = +·329$, $E = -·944$; $G = +·700$, $H = +·244$, $K = -·672$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Budapest		0·5	190	i 0 12	− 2	i 0 18	− 5	—	—	—
Ogyalla		0·7	259	i 0 16	− 1	e 0 26	− 2	—	—	—
Skalnate Pleso		1·4	30	i 0 28	+ 1	i 0 46	0	—	—	—
Kalossa		1·5	186	0 37	+ 9	i 0 51	+ 2	i 0 55	S_g	—
Vienna		1·9	278	i 0 36	+ 2	e 1 5	+ 6	e 0 50	PP	—
Raciborzu		2·2	342	e 0 36?	− 2	i 0 57	− 9	0 42	P_g	—
Uzhgorod		2·2	73	e 0 37	− 1	i 1 10	S*	—	—	—
Timisoara		2·6	148	(i 0 47)	+ 3	(i 1 34)	S_g	(i 0 59)	P_g	—
Belgrade		3·3	164	0 54a	+ 1	e 1 39	+ 4	e 1 4	P_g	—
Lwow		3·6	58	1 1	+ 3	2 6	S_g	—	—	—
Prague		3·8	304	i 1 3	+ 2	e 1 48	+ 1	i 1 20	P_g	—
Triest		4·4	240	e 1 28	P_g	i 2 14	S*	i 2 29	S_g	—
Cheb		5·0	298	e 1 42	P_g	e 2 17	− 1	e 2 42	S_g	—
Jena		5·8	303	e 1 31	+ 2	e 2 31	− 7	e 1 39	P*	—
Sonneberg		5·8	298	—	—	e 2 34?	− 4	i 3 21	S_g	—
Potsdam	E.	5·9	320	—	—	e 2 22	−18	e 3 2	S*	—
Bucharest		6·0	125	e 2 1	P_g	e 2 49	+ 6	e 3 5	S*	—
Sofia		6·0	150	e 1 35	+ 3	e 2 57	+14	e 3 26	S_g	—
Ravensburg		6·4	272	e 1 37	− 1	e 3 26	S_g	—	—	—
Salo	z.	6·4	251	—	—	e 2 59	+ 6	e 3 41	S_g	—
Chur		6·6	264	e 1 41k	0	e 2 43	−15	—	—	—
Kishinev		6·6	95	1 43	+ 2	e 3 31	S_g	—	—	—
Stuttgart	z.	6·7	280	e 1 41	− 1	e 2 56	− 4	e 2 16	P_g	—
Prato		7·0	237	e 2 32	P_g	i 4 8	S_g	—	—	—
Karlsruhe		7·2	282	e 1 52	+ 3	e 3 40	S*	e 4 2	S_g	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zürich		7·2	261	e 1 47	− 2	e 2 56	−17	e 3 31	S*	—
Strasbourg		7·6	279	e 1 56	+ 1	e 3 29	+ 6	e 2 44	P_g	—
Rome		7·7	220	e 2 0?	+ 4	—	—	—	—	—
Basle		7·8	271	e 1 56	− 2	—	—	e 2 34	P_g	—
Neuchatel		8·4	268	e 2 1	− 5	—	—	—	—	e 4·7
Besançon		9·0	270	e 2 58	P_g	e 4 4	+ 6	e 4 37	S*	e 5·3
Paris		11·1	280	e 2 43	0	i 5 18	+29	e 2 52	PP	i 6·1
Pulkovo		13·5	25	e 3 11	− 4	—	—	—	—	—
Sverdlovsk		26·4	53	e 5 41	+ 1	—	—	—	—	—
Tamanrasset	Z.	27·4	208	e 5 52	+ 3	e 8 40	?	—	—	—
Bombay		52·0	104	e 11 52?	PP	—	—	—	—	—
Kodaikanal	E.	61·4	107	e 13 8	PP	—	—	—	—	—
Colombo	N.	65·5	108	12 22	?	—	—	—	—	30·2

Additional readings and note :—
Ogyalla e =20s.
Skalnate Pleso eN =34s., cE =38s., iS_g =49s.
Kalossa PPE =40s. and 45s., iSSEN =1m.2s., SSN =1m.15s.
Vienna eS_g =1m.7s.
Raciborzu eP_gE =45s., iS_g =1m.13s., iE =1m.25s.
Timisoara eS_gEN =(1m.43s.), readings having been reduced by 5m.
Belgrade eS_gNE =1m.51s., iNE =2m.3s. and 2m.19s., iNW =2m.26s., eNE =2m.44s.
Prague eP* =1m.11s., e =1m.16s. and 1m.34s., eN =1m.40s., iS* =1m.58s., eS_g =2m.8s. and 2m.14s.
Triest iP_g =1m.44s., iP_gP_g =1m.49s., iSS_g =2m.34s.
Cheb e =2m.11s., 2m.29s., and 3m.0s.
Jena eP*?E =1m.42s., eP_g?EN =2m.7s., eE =2m.17s. and 2m.45s., eEN =2m.51s., iEN =3m.1s., iS*?N =3m.12s., iS_gE =3m.18s.
Sonneberg eN =2m.42s.? and 3m.14s., iN =3m.40s., iE =3m.46s. and 4m.22s., iN = 4m.28s.
Bucharest eE =2m.57s. and 3m.25s., eN =3m.32s.
Ravensburg eS_g? =3m.42s.
Salo eSZ =3m.53s.
Stuttgart eZ =1m.44s., 1m.49s., and 1m.52s., eP*Z =2m.0s., eZ =2m.12s., eSZ = 2m.45s., eS*Z =3m.23s. and 3m.26s., eS_gZ =3m.43s. and 3m.53s.
Strasbourg eP* =2m.22s., e =3m.52s., iS_g =4m.12s., i =4m.28s. and 4m.33s.
Basle e =2m.8s.
Beasnçon e =3m.9s., 3m.41s., and 4m.59s., iS_g =5m.6s.
Paris iPPP? =3m.16s., e =3m.22s.
Long waves were also recorded at Istanbul, Copenhagen, Upsala, Helsinki, and Pasadena.

Feb. 20d. 10h. 12m. 26s. Epicentre 3°·98. 128°·2E. (as on 1950, Dec. 18d.).

A = −·6170, B = +·7840, C = −·0676 ; δ = −9 ; h = +7 ;
D = +·786, E = +·618 ; G = +·042, H = −·053, K = −·998.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bandong		20·7	262	e 4 43	− 1	—	—	—	—	—
Djakarta		21·4	264	e 5 36	PP	—	—	—	—	—
Riverview	E.	36·7	146	—	—	e 15 16	SS	i 18 41	Q	e 20·5
Vladivostok		46·9	4	e 8 31	− 3	e 15 16	− 9	—	—	—
Bombay		59·0	295	e 10 12	+ 8	—	—	—	—	—
Kurmenty		64·9	322	e 10 41	− 2	—	—	—	—	—
Almata		65·8	322	10 46	− 3	e 19 20	−15	—	—	—
Frunse		67·1	320	e 11 2	+ 5	—	—	—	—	—
Andijan		67·6	317	e 10 57	− 4	e 19 50	− 7	—	—	—
Fergana		67·8	317	e 10 58	− 4	—	—	—	—	—
Tashkent		69·9	316	e 11 20	+ 5	—	—	—	—	—
Sverdlovsk		81·2	329	12 18	− 1	e 22 20	− 9	—	—	—
College		90·9	25	e 13 6	− 1	—	—	—	—	—
Ksara		94·1	303	e 17 18	PP	e 26 42	PPS	—	—	—
China Lake	Z.	111·8	53	e 19 21	PP	—	—	—	—	—
Strasbourg		112·7	322	e 13 56	P	—	—	—	—	—
Overton	Z.	114·2	51	e 18 48	[+ 7]	—	—	—	—	—
Pierce Ferry		114·6	51	e 19 6	[+24]	—	—	e 19 50	PP	—
Tamanrasset	Z.	121·6	295	e 19 2	[+ 6]	—	—	—	—	—

Long waves were recorded at Christchurch, Wellington, and Apia.

Feb. 20d. 15h. 24m. 22s. Epicentre 21°·08S. 114°·0W.

A = −·3801, B = −·8536, C = −·3563 ; δ = +6 ; h = +4 ;
D = −·914, E = +·407 ; G = +·145, H = +·325, K = −·934.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		38·0	82	e 7 21	0	e 13 16	+ 2	e 8 44	PP	e 15·9
Puebla		42·7	23	e 8 2	+ 2	—	—	e 21 26	Q	e 21·9
Tacubaya		42·7	22	i 8 4	+ 4	—	—	e 10 46	PPP	e 21·2
La Paz		43·6	92	i 8 9	+ 1	i 14 38	0	i 18 38	SSS	21·4
Vera Cruz		43·6	26	e 11 58	?	e 16 48	?	—	—	e 22·2
La Plata		50·8	118	1 20	?	16 8	−12	19 26	Q	24·2
Tucson		53·0	4	i 9 21	0	e 16 53	+ 3	e 11 36	PP	e 23·1
Palomar		54·1	358	i 9 29	0	—	—	i 17 15	sS	—
Riverside	z.	54·8	357	e 9 34	0	—	—	—	—	—
Pasadena		55·0	357	i 9 36a	+ 1	e 17 24	sS	—	—	e 23·4
China Lake	z.	56·6	358	i 9 46	− 1	—	—	—	—	—
Boulder City		56·7	1	i 9 48	0	—	—	—	—	—
Pierce Ferry		56·8	2	i 9 49	+ 1	—	—	—	—	—
Overton	z.	57·2	1	i 9 52	+ 1	—	—	—	—	—
Fresno		57·7	355	e 9 54k	− 1	e 18 16	PPS	—	—	—
Lick	z.	58·5	353	i 10 0a	0	e 19 11	ScS	e 11 5	PcP	—
Reno		60·5	356	e 10 15k	+ 1	—	—	e 10 43	PcP	—
Mineral	z.	61·4	354	e 10 24k	+ 4	—	—	—	—	—
Morgantown		68·2	28	i 11 4	0	—	—	i 12 14	?	—
Hungry Horse		69·0	2	e 11 9	0	—	—	—	—	—
Cleveland	E.	69·1	26	e 11 9	− 1	—	—	—	—	—
Palisades		72·1	31	e 11 27	− 1	—	—	—	—	e 36·8
Ottawa		74·7	27	—	—	e 29 21	SSS	36 54	Q	e 40·2
College		89·5	347	e 12 58	− 2	e 23 52	+ 2	—	—	e 41·7
Tamanrasset		124·2	76	e 18 59	[− 2]	—	—	17 28	?	—
Stuttgart	z.	127·3	44	e 23 27	PPP	—	—	—	—	—
Collmberg	z.	129·1	40	e 28 44	PKKP	—	—	—	—	—
Helwan	z.	147·6	67	e 20 2	PKP_2	—	—	—	—	—
Ksara		150·5	59	e 20 39?	PKP_2	—	—	—	—	—
Bombay		173·3	—	—	—	e 27 38?	[+25]	e 32 24	SKKS	—

Additional readings :—
La Paz iSS = 17m.56s.
La Plata P_cSE = 6m.38s., E = 8m.2s., SSSE = 15m.56s. Timing wrong ?
Tucson eP_cP? = 10m.41s., eSS = 21m.3s.
Fresno eZ = 10m.6s., eN = 10m.18s., eZ = 11m.18s.
Tamanrasset ePPZ = 20m.46s.
Helwan eZ = 20m.26s., iZ = 21m.12s., eZ = 21m.47s.
Ksara e = 24m.24s.
Long waves were also recorded at Seven Falls, Weston, and Harvard.

Feb. 20d. Readings also at 0h. (Riverview, Auckland, Christchurch, Kaimata, Wellington, Pretoria, Hungry Horse, College, Ottawa, Palisades, and Washington), 1h. (Almeria, Granada, De Bilt, Kew, Pierce Ferry, Mineral, College, Harvard, near Apia, and near Triest), 2h. (China Lake, Tucson, Boulder City, Overton, Pierce Ferry, Tamanrasset, Almata II, near Chilisk (2), Ili (2), Kurmenty (2), and Stuttgart), 3h. (College, Hungry Horse, Merida, Tacubaya, and Vera Cruz), 4h. (Chilisk, Ili, and near Kurmenty), 5h. (Pierce Ferry), 7h. (Merida, Tacubaya, La Paz, and Rathfarnham Castle), 8h. (near Andijan), 10h. (near Andijan and near Istanbul (2)), 11h. (Overton and Hungry Horse), 12h. (Tucson, Overton (2), Pierce Ferry (2), and near Andijan (2)), 13h. (Palomar, Pasadena, China Lake (2), Tinemaha, Tucson, Boulder City, Overton (2), Pierce Ferry (2), Fresno, Lick (2), Reno, Mineral, Hungry Horse (2), College, Logan, Huancayo, Brisbane, Kabansk, and near Irkutsk), 15h. (Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Lick, Reno, Mineral, Hungry Horse, College, Christchurch, Wellington, Mizusawa, and near Yuzno-Sakhlinsk), 16h. (Pierce Ferry), 17h. (near Grozny), 18h. (Collmberg (2)), 19h. (near Kirovobad), 20h. (Pierce Ferry and near Huancayo), 21h. Tiflis and near Grozny), 22h. (Collmberg, Ili, Krasnogorka, near Chilisk, Kurmenty, and near Istanbul), 23h. (La Paz and Pierce Ferry (2)).

Feb. 21d. 2h. 24m. 15s. Epicentre 28°·7N. 94°·2E. (as on 1951, Jan. 4d.).

A = −·0643, B = +·8762, C = +·4777; δ = +6; h = +2;
D = +·997, E = +·073; G = −·035, H = +·476, K = −·879.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		6·5	255	1 40	+ 1	i 2 50	− 5	1 53	P*	2·9
Calcutta		8·1	222	3 7	+65	—	—	—	—	—
New Delhi		14·9	274	e 3 30	− 4	6 24	+ 4	3 40	PP	—
Kurmenty		19·2	322	i 4 29	+ 1	—	—	—	—	—
Naryn		19·5	316	i 4 31	0	8 13	+ 7	—	—	—
Almata		20·1	322	i 4 38	0	i 8 34	+15	—	—	—
Ili		20·4	323	i 4 41	0	—	—	—	—	—
Khorog		20·8	300	e 4 47	+ 2	—	—	—	—	—
Krasnogorka		21·1	317	e 4 47	− 1	—	—	—	—	—
Frunse		21·2	316	i 4 51	+ 2	8 53	+12	—	—	—
Poona		21·2	246	e 4 48	− 1	8 48	+ 7	5 3	PP	9·4
Andijan		21·5	309	4 53	+ 1	—	—	—	—	—
Bombay		21·8	248	e 5 7	+11	9 0	+ 8	9 32	SS	10·4
Fergana		21·8	309	e 4 56	0	—	—	—	—	—
Kulyab		22·3	300	e 5 1	0	e 9 4	+ 2	—	—	—
Lunacharskoe		23·9	308	e 5 16	0	—	—	—	—	—
Tashkent		23·9	308	e 5 19	+ 3	e 9 35	+ 5	—	—	—
Tchimkent		24·1	311	i 5 19	+ 1	—	—	—	—	—
Irkutsk		24·7	13	e 5 25?	+ 1	e 9 56	+12	—	—	—
Samarkand		24·9	303	e 5 28	+ 2	—	—	—	—	—
Kabansk		25·1	17	e 5 31	+ 3	—	—	—	—	—
Sverdlovsk		36·7	330	i 7 10	0	e 13 0	+ 6	—	—	—
Collmberg	z.	62·9	316	10 27	− 3	—	—	—	—	—
Stuttgart	z.	65·9	314	e 10 48	− 2	—	—	e 10 56	P	—
College		75·2	23	i 11 44	− 2	—	—	—	—	—
Tamanrasset	z.	78·3	290	e 12 3	0	—	—	—	—	—
Hungry Horse		99·2	19	e 17 40	PP	—	—	—	—	—

Additional readings:—
Chatra PPZ = 1m.45s., P_gEZ = 2m.8s., QEZ = 2m.35s., SSE = 3m.1s., S*EZ = 3m.6s., SSSEZ = 3m.12s.
New Delhi PPPE = 3m.47s., eSEN = 6m.8s., SSSEN = 6m.34s.
Poona eSE = 8m.26s., SSSE = 8m.59s.
Bombay SSN = 9m.38s.

Feb. 21d. 7h. 19m. 27s. Epicentre 36°·0S. 179°·0W. Depth of focus 0·005.

Wellington and Strasbourg give epicentre as adopted.

A = −·8108, B = −·0142, C = −·5852; δ = +6; h = 0;
D = −·017, E = +1·000; G = +·585, H = +·010, K = −·811.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tuai	N.	4·1	226	e 1 3	+ 1	i 1 52	+ 3	—	—	—
Auckland	N.	5·0	259	i 1 15	+ 1	i 2 13?	+ 1	—	—	—
New Plymouth	E.	6·3	239	e 1 33	+ 1	e 3 1	+17	—	—	—
Wellington		7·2	220	e 1 41	− 4	i 3 0	− 6	—	—	—
Cobb River		8·2	229	e 1 53	− 6	e 3 23	− 8	—	—	—
Kaimata	N.E.	9·9	226	e 2 19	− 3	e 3 53	−19	—	—	—
Christchurch		9·9	218	e 2 26	+ 4	e 4 5	− 7	—	—	—
Riverview		24·5	266	i 5 30a	+16	i 9 33	+ 6	i 10 23	SS	e 11·6
Brisbane		25·2	282	i 5 20a	− 1	e 9 30	− 9	—	—	—
Pasadena	z.	90·1	46	e 12 54	0	—	—	i 13 18	pP	—
Palomar		90·2	48	i 12 56	+ 1	—	—	i 13 20	pP	—
Berkeley	z.	90·3	42	e 12 56	+ 1	—	—	e 13 20	pP	—
Lick	z.	90·3	42	e 12 55k	0	—	—	i 13 22	pP	—
Riverside	z.	90·3	46	e 12 57	+ 2	—	—	i 13 21	pP	—
Fresno	z.	90·9	44	e 12 59k	+ 1	—	—	e 13 23	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
China Lake	z.	91·5	45	i 13 0	− 1	—	—	i 13 25	pP	—
Tinemaha	z.	92·0	44	e 13 7	+ 4	—	—	i 13 30	pP	—
Shasta Dam		92·3	39	e 13 6	+ 2	—	—	—	—	—
Mineral	z.	92·5	39	e 13 5a	0	—	—	i 13 31	pP	—
Reno	z.	92·9	41	e 12 57	−10	—	—	—	—	—
Boulder City		93·2	47	i 13 11	+ 3	—	—	—	—	—
Tucson		93·2	51	e 13 10	+ 2	—	—	i 13 35	pP	e 43·2
Huancayo		93·8	107	e 25 35	PS	e 23 46	[+ 7]	e 30 41	SS	e 43·5
Overton	z.	93·8	46	e 13 11	0	—	—	i 13 37	pP	—
Pierce Ferry		93·8	47	e 13 12	+ 1	—	—	—	—	—
La Paz		96·4	115	13 35	+12	24 2	[+ 9]	i 24 28	S	46·0
Hungry Horse		102·0	37	e 13 24	−24	—	—	i 14 51	?	—
College		103·4	12	e 13 57	+ 3	—	—	e 23 37	?	e 51·0
Ottawa		123·1	54	e 18 50	[+ 1]	—	—	e 19 14	pPKP	e 62·6
Weston		125·1	59	e 18 48	[− 5]	—	—	—	—	e 63·0
Ksara		151·4	276	i 19 47	[+ 7]	—	—	20 11	pPKP	—
Helwan	z.	153·9	265	e 19 47	[+ 3]	e 23 43	PKS	i 20 6	pPKP	—
Collmberg	z.	162·4	334	e 20 41	PKP_2	—	—	—	—	—
Stuttgart	z.	165·9	337	e 19 53?	[− 4]	—	—	e 20 57	PKP_2	—
Tamanrasset	z.	166·3	198	e 20 1	[+ 3]	—	—	e 24 44	PP	—

Additional readings :—
Riverview iE = 9m.36s.
Pasadena eZ = 13m.7s.
Palomar eZ = 13m.12s.
Berkeley eZ = 13m.8s.
Riverside eZ = 13m.10s.
China Lake eZ = 13m.13s.
Tucson ePKKP = 30m.54s.
La Paz iPS = 26m.9s., i = 26m.48s.
Ottawa e = 59m.33s.
Helwan eZ = 20m.50s.
Tamanrasset eZ = 25m.15s.
Long waves were also recorded at Harvard and Palisades.

Feb. 21d. 17h. South Western Wyoming, felt at Rock Spring.

U.S.C.G.S. gives epicentre 43°N. 110°W.

Bozeman eP = 10m.46s., iS = 11m.18s., iL = 11m.24s.
Butte eP? = 11m.2s., eS = 11m.41s., eL = 11m.46s.
Rapid City ePE = 11m.12s., iS?E = 12m.29s., eLE = 13m.16s.
Hungry Horse eP = 11m.28s., e = 11m.50s. and 12m.2s.
Overton iPZ = 11m.47s., iZ = 12m.24s., iLZ = 13m.52s.
Pierce Ferry iP = 11m.50s.
Boulder City iP = 11m.56s.
Shasta Dam eP? = 12m.2s.
Tinemaha iPZ = 12m.8s., iS?Z = 14m.31s.
China Lake ePZ = 12m.14s., eSN = 14m.48s., iZ = 14m.55s.
Haiwee iPZ = 12m.14s., eZ = 14m.56s.
Mineral eZ = 12m.19s.a, iZ = 12m.43s. and 12m.56s.
Reno ePZ = 12m.40s.k, eZ = 14m.6s., eEN = 14m.19s., eZ = 14m.28s. and 14m.52s.
Lick eZ = 12m.42s.k and 15m.37s.
Tucson eP? = 12m.44s., i = 12m.55s. and 13m.17s., eS? = 13m.43s., eL = 15m.20s.
St. Louis eP = 13m.37s.
Fresno eE = 15m.17s., eNZ = 15m.19s.
College eP = 16m.18s.
Long waves were also recorded at Seattle, Morgantown, Shawinigan Falls, and Harvard.

Feb. 21d. 19h. 36m. 6s. Epicentre 36°·9N. 141°·3E. Focus at base of superficial layers. (as on 1950, Dec. 23d.).

Intensity II-III in the region of Mito, Aso, and Ryugasaki.
Epicentre 37°·0N. 141°·3E. Depth 20km.

The Seismological Bulletin of the Central Meteorological Observatory, Japan, for Feb., 1951, Tokyo, 1951, p.42, with macroseismic chart.

$A = -\cdot6256$, $B = +\cdot5012$, $C = +\cdot5978$; $\delta = -6$; $h = -1$;
$D = +\cdot625$, $E = +\cdot780$; $G = -\cdot467$, $H = +\cdot374$, $K = -\cdot802$.

	△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.
Onahama	0·3	276	0 21	+13	0 25	+10
Mito	0·8	232	0 18	+ 3	0 33	+ 7
Shirakawa	0·9	284	0 16	0	0 27	− 1
Hukusima	1·1	322	0 16	− 3	0 27	− 6
Inawashiro	1·2	305	0 12	− 8	0 26	−10
Tukubasan	1·2	235	0 20	0	0 37	+ 1
Utunomiya	1·2	253	0 19	− 1	0 35	− 1
Sendai	1·4	347	1 2	+39	1 15	+34
Kumagaya	1·7	244	0 30	+ 2	0 49	0
Tokyo	1·7	225	0 29	+ 1	0 51	+ 2
Maebasi	1·8	254	0 29	0	0 51	0
Yokohama	2·0	222	0 56	S	(0 56)	0

Feb. 21d. 20h. 40m. 35s. Epicentre 18°·9N. 68°·9W. (as on 1949, June 12d.).

U.S.C.G.S. suggests epicentre 18°·5N. 68°·5W. Depth 100km.

$A = +\cdot3408$, $B = -\cdot8833$, $C = +\cdot3220$; $\delta = +5$; $h = +5$;
$D = -\cdot933$, $E = -\cdot360$; $G = +\cdot116$, $H = -\cdot300$, $K = -\cdot947$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.	L. m.
Ciudad Trujillo		1·1	245	−0 28?	?	i 0 53	?	—	—
San Juan		2·7	101	i 0 42	− 3	i 1 12	− 7	—	i 1·8
Bogota		15·1	200	e 3 37	+ 1	e 6 10	−15	—	—
Washington	z.	21·2	344	i 4 57	+ 8	—	—	—	—
Palisades		22·4	351	i 5 4	+ 2	i 9 15	+11	—	—
Weston		23·5	357	i 5 13	+ 1	e 9 35	+12	i 5 38	?
Harvard		23·6	357	i 5 15	+ 2	e 9 35	+10	—	—
Ottawa	z.	27·0	350	e 5 46	+ 1	—	—	—	—
Tucson		39·8	298	i 7 37	+ 1	—	—	—	—
Pierce Ferry		43·1	303	i 8 4	0	—	—	—	—
Overton	z.	43·5	304	i 8 8	+ 1	—	—	—	—
Boulder City		43·7	303	i 8 9	+ 1	—	—	—	—
Riverside	z.	45·5	300	i 8 27a	+ 4	—	—	—	—
China Lake	z.	45·9	302	i 8 25	− 1	—	—	—	—
Pasadena	z.	46·2	300	i 8 26	− 2	—	—	—	—
Hungry Horse		46·7	320	i 8 31	− 1	—	—	—	—
Tinemaha	z.	46·7	304	i 8 31	− 1	—	—	i 8 44	?
Reno	z.	48·2	307	e 9 12	+28	—	—	—	—
Lick	z.	49·4	304	8 52a	− 1	—	—	—	—
Mineral		49·7	307	i 8 55k	− 1	—	—	e 9 1	?
Shasta Dam		50·4	308	e 8 57	− 4	—	—	—	—
College		68·3	334	e 11 2	− 3	—	—	—	—
Tamanrasset	z.	69·0	72	e 11 1	− 8	—	—	e 11 28	PcP

Lick also gives iZ = 9m.4s. and 9m.36s.

Feb. 21d. Readings also at 2h. (near Istanbul), 3h. (La Paz and near Kabansk), 4h. (Pierce Ferry, Overton, and Tucson (2)), 5h. (Tacubaya and Puebla), 6h. (Samarkand, near Andijan, Fergana, Khorog, and Kulyab), 7h. (Tamanrasset, Messina, and near Athens), 9h. (Pierce Ferry, Overton, and Tucson), 12h. (Tucson, near Chinchina, and Bogota), 13h. (Almata, Chilisk, Frunse, Ili, Kurmenty, Rybach'e, Samarkand, Tashkent, near Andijan, Fergana, Khorog (2), Kulyab, Lunacharskoe, Naryn, New Delhi, College, Shasta Dam, and near Mary), 14h. (Huancayo), 15h. (College, Ottawa, La Paz, and near Huancayo), 17h. (Weston, Harvard, near Ciudad Trujillo, and San Juan), 18h. (College, Boulder City, Hungry Horse, Overton, and Pierce Ferry), 19h. (College), 20h. (College and Pierce Ferry), 21h. (near (Kurmenty), 22h. (near Apia (3)), 23h. (near Huancayo).

Feb. 22d. 1h. 45m. 42s. Epicentre 3°·7S. 142°·2E. (as on 1946, May 8d.).

$A = -\cdot7896$, $B = +\cdot6103$, $C = -\cdot0641$; $\delta = +4$; $h = +7$;
$D = +\cdot611$, $E = +\cdot791$; $G = +\cdot051$, $H = -\cdot039$, $K = -\cdot998$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		25·8	158	i 5 38a	+ 4	e 10 9	+ 7	—	—	—
Riverview		31·1	165	i 7 48	PP	e 11 34	+ 6	—	—	e 15·4
Bandoeng		34·6	264	e 8 20	PP	—	—	—	—	—
Djakarta		35·4	265	e 8 20	PP	—	—	—	—	—
Zi-ka-wei	z.	40·0	333	e 7 39	+ 1	e 13 50	+ 6	9 17	PP	—
Nanking		42·0	330	7 53a	− 1	e 14 8	− 6	—	—	—
Cobb River	E.	46·2	147	e 9 18?	+50	—	—	—	—	—
Wellington		47·4	147	e 14 18?	PcS	—	—	e 22 28	Q	e 26·3
Christchurch		47·9	150	—	—	e 20 18	SSS	e 21 43	Q	e 24·8
Irkutsk		64·4	335	i 10 37	− 3	—	—	—	—	—
Bombay		71·9	292	e 11 27	0	e 20 45	− 3	e 14 4	PP	—
Almata		74·9	317	i 11 43	− 1	e 21 21	− 1	—	—	—
Naryn		75·0	315	e 11 43	− 2	21 20	− 3	—	—	—
Ili		75·1	318	e 11 47	+ 1	—	—	—	—	—
Frunse		76·4	315	i 11 53	0	e 21 40	+ 2	—	—	—
Andijan		77·4	312	11 58	0	21 51	+ 2	—	—	—
Kulyab		78·6	310	e 12 7	+ 2	e 22 8	+ 6	—	—	—
Tashkent		79·8	313	i 12 9	− 3	i 22 11	− 3	—	—	—
Tchimkent		79·8	314	i 12 10	− 2	—	—	—	—	—
Samarkand		81·1	311	e 12 23	+ 5	—	—	—	—	—
College		84·9	24	i 12 35	− 3	i 22 58	− 8	e 28 58	SS	e 34·8
Sverdlovsk		88·5	327	e 12 56	0	e 23 31	−10	—	—	—
Shasta Dam		96·4	49	i 13 32	0	—	—	—	—	—
Mineral	z.	97·0	50	e 13 35k	0	—	—	—	—	—
Mount Wilson	z.	100·0	56	e 13 53	+ 5	—	—	—	—	—
China Lake	z.	100·3	54	e 13 50	0	—	—	e 18 0	PP	—
Riverside	z.	100·6	56	e 13 57	+ 6	—	—	—	—	—
Hungry Horse		101·8	41	e 13 56	0	—	—	—	—	—
Overton	z.	102·8	53	e 18 13	PP	—	—	—	—	—
Pierce Ferry		103·2	54	e 18 23	PP	—	—	—	—	—
Ksara		105·7	304	e 17 44	?	28 46	PPS	18 41	PP	—
Tucson		106·2	57	e 17 37	PKP	—	—	e 21 27	PPP	e 47·6
Helwan	z.	110·0	300	e 18 46	PP	—	—	—	—	—
Stuttgart		119·9	326	e 18 54	[+ 1]	—	—	—	—	e 64·3
Ottawa		126·8	32	e 19 6	[0]	e 38 18?	SS	—	—	—
Seven Falls	E.	128·1	28	—	—	e 35 18?	?	—	—	—
Tamanrasset	z.	134·1	299	e 19 22	[+ 2]	e 22 44	PKS	e 21 46	PP	—
Huancayo		139·4	113	—	—	e 40 36	SS	e 45 39	SSS	e 67·6
La Paz		143·8	125	19 48	[+11]	—	—	—	—	70·3
San Juan		148·6	59	e 19 50	[+ 5]	—	—	—	—	—

Additional readings :—
Nanking i = 8m.4s.
Helwan eZ = 19m.9s. and 19m.48s.
Tamanrasset ePPP?Z = 24m.38s.
Huancayo e = 41m.18s.
Long waves were also recorded at Perth, Pasadena, La Plata, Aberdeen, De Bilt, Kew, and Paris.

Feb. 22d. 17h. 56m. 48s. Epicentre 24°·38. 67°·4W. Depth of focus 0·015.
(as on 1950, December 9d.).

Intensity IV between south latitudes 27°-28°.

F. Greve.
Boletin del Año. 1951, Inst. Sism. Univ. de Chili, p. 8.

$A = +·3506$, $B = -·8421$, $C = -·4097$; $\delta = -9$; $h = +4$;
$D = -·923$, $E = -·384$; $G = -·157$, $H = +·378$, $K = -·912$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		7·8	355	1 56	+ 4	i 3 2	−17	—	—	—
La Plata		13·4	144	3 42	PPP	—	—	—	—	6·4
Huancayo		14·4	327	e 3 17	− 2	i 6 1	+ 5	—	—	—
Bogota		29·5	346	e 5 56	+ 2	e 10 44	+ 6	—	—	—
Chinchina		30·2	345	e 5 58	− 2	e 10 48	− 1	—	—	—
San Juan		42·5	3	e 7 40	− 4	—	—	i 9 24	PP	—
Weston		66·5	358	e 10 21	−17	—	—	—	—	—
Harvard		66·6	358	i 10 39	0	—	—	—	—	—
Ottawa		69·8	354	10 57	− 1	—	—	—	—	—
Tucson		69·9	322	e 10 59	0	—	—	e 11 32	pP	—
Palomar	z.	74·2	319	i 11 20	− 4	—	—	—	—	—
Pierce Ferry		74·5	323	i 11 27	+ 1	—	—	—	—	—
Boulder City		74·9	322	i 11 29	+ 1	—	—	—	—	—
Riverside	z.	75·0	319	i 11 30	+ 1	—	—	i 12 6	pP	—
Overton	z.	75·1	323	i 11 31	+ 1	—	—	—	—	—
Pasadena	z.	75·6	319	i 11 32	0	—	—	—	—	—
China Lake	z.	76·4	321	i 11 39k	+ 2	—	—	i 12 15	pP	—
Tinemaha	z.	77·6	321	i 11 45k	+ 2	—	—	i 12 19	pP	—
Fresno	z.	78·3	320	e 11 48a	+ 1	—	—	—	—	—
Lick	z.	79·8	319	e 11 57a	+ 2	e 16 54	PPP	i 12 30	pP	—
Grahamstown	z.	80·1	122	i 12 8	PcP	—	—	—	—	—
Reno	z.	80·2	322	e 11 59k	+ 1	—	—	—	—	—
Mineral	z.	81·7	321	e 12 1a	− 5	—	—	—	—	—
Shasta Dam		82·4	321	i 12 9	0	—	—	—	—	—
Hungry Horse		83·5	331	i 12 16	+ 1	—	—	—	—	—
Pretoria	z.	84·4	115	i 12 29	PcP	—	—	—	—	—
Tamanrasset	z.	84·9	62	i 12 28	+ 6	e 22 51	+13	e 13 3	pP	—
Ksara		113·7	62	e 21 26	PPP	e 30 58	PPS	—	—	—

Additional readings :—
La Paz i = 2m.22s. and 2m.57s., iS_g = 3m.41s.
Bogota e = 10m.3s.
San Juan i = 7m.49s.
Riverside iZ = 12m.20s.
Fresno eZ = 11m.57s., eE = 12m.45s., eN = 13m.12s.
Tamanrasset eZ = 12m.45s. and 14m.56s., ePPZ = 16m.8s., esS?Z = 23m.35s.

Feb. 22d. Readings also at 0h. (Pierce Ferry, near Chilisk, and Kurmenty), 1h. (Tacubaya, near Hungry Horse, near Huancayo, and near Chilisk), 3h. (Tamanrasset and near San Juan), 4h. (La Paz, La Plata, Overton, Pierce Ferry, College, and Tamanrasset), 5h. (Ksara), 6h. (College), 8h. (Puebla and near Tacubaya), 11h. (near Seattle), 12h. (College), 13h. (Tamanrasset (2)), 14h. (Collmberg), 16h. (Paris and Pierce Ferry), 18h. (Tamanrasset), 19h. (College and La Paz), 20h. (Almata II, near Chilisk, Ili, Krasnogorka, and Kurmenty), 21h. (Mizusawa, Ottawa, Riverside, China Lake, Tucson, Hungry Horse, College, Merida, Vera Cruz, near Oaxaca, Puebla, Tacubaya, and near Manila), 23h. (Fergana, near Andijan, and near Kulyab).

Feb. 23d. 2h. 56m. 41s. Epicentre 44°·5N. 129°·7W. (as on 1944, March 7d.).

$A = -·4571$, $B = -·5506$, $C = +·6985$; $\delta = 0$; $h = -3$;
$D = -·769$, $E = +·639$; $G = -·446$, $H = -·537$, $K = -·716$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Arcata		5·5	129	—	—	e 2 43	S*	—	—	—
Victoria		5·9	45	i 1 29	− 2	—	—	e 2 19	P_g	i 4·1
Seattle		6·0	56	i 1 33	a + 1	e 2 48	+ 5	e 3 7	S*	e 3·6
Shasta Dam		6·6	122	i 1 40	− 1	—	—	—	—	—
Mineral	z.	7·3	122	e 1 52	+ 2	e 3 46	S*	—	—	—
Berkeley		8·7	137	—	—	e 3 59	+ 9	i 5 42	Q	i 7·0
Reno		8·9	120	e 2 13	k + 1	e 4 37	S*	—	—	e 5·4
Lick	z.	9·4	137	e 2 17	a − 1	—	—	e 2 33	?	e 7·0
Fresno	z.	10·8	132	e 2 36	k − 3	—	—	—	—	—
Tinemaha	z.	11·4	126	e 2 47	0	—	—	—	—	—
Hungry Horse		11·5	65	i 2 45	− 3	i 4 14	−45	—	—	—
China Lake	z.	12·7	129	i 3 5	0	—	—	—	—	—
Logan		13·4	95	e 3 14	0	—	—	—	—	e 7·1
Pasadena		13·6	135	e 3 16	− 1	e 5 55	+ 5	i 3 26	PP	i 6·3
Salt Lake City		13·6	99	e 3 24	+ 7	e 5 53	+ 3	e 3 56	?	e 6·5
Overton	z.	14·1	119	i 3 23	0	—	—	—	—	—
Boulder City		14·2	122	e 3 24	0	—	—	—	—	—
Riverside	z.	14·2	133	e 3 23	− 1	—	—	—	—	—
Pierce Ferry		14·6	119	i 3 28	− 2	—	—	—	—	—
Palomar		14·9	134	i 3 33	− 1	—	—	i 3 39	P	—
Saskatoon		17·1	56	i 4 2	0	—	—	—	—	e 9·6
Rapid City	E.	19·0	82	i 4 25	? − 1	—	—	—	—	e 9·5
Tucson		19·1	124	e 4 26	− 1	e 8 12	+15	e 5 4	?	e 9·7
College		22·8	340	e 5 4	− 1	e 9 23	+12	e 5 29	PP	e 10·3
Lincoln	E.	24·5	85	—	—	e 9 43	+ 3	—	—	e 13·5
Chicago		30·6	81	—	—	e 11 19	− 1	—	—	e 17·2
Resolute Bay		33·9	15	6 46	− 1	—	—	—	—	e 17·7
Sverdlovsk		78·7	354	e 12 21	+15	e 22 12	+ 9	—	—	—
Collmberg	z.	79·3	23	e 12 7	− 2	—	—	—	—	—
Almeria		86·0	40	e 12 48	+ 5	—	—	16 0	PP	46·7

Additional readings :—
Seattle e = 2m.18s.
Reno eEN = 4m.40s.
China Lake iZ = 3m.12s. and 3m.16s.
Logan iP = 3m.18s., e = 3m.39s.
Long waves were also recorded at Ottawa, Seven Falls, Palisades, Kew, Rathfarnham Castle, and Scoresby Sund.

Feb. 23d. 15h. 21m. 30s. Epicentre 34°·1N. 134°·0E. (as on 1938, April 1d.).

Intensity II-III at Tokusima, Takamatsu, Sumoto, and Hirosima.
Epicentre 33°·9N. 133°·8E. Depth 20km.

The Seismological Bulletin of the Cent. Met. Obs., Japan, for February, 1951, Tokyo, 1951, p. 43, with macroseismic chart.

$A = -·5764$, $B = +·5969$, $C = +·5580$; $\delta = -11$; $h = 0$;
$D = +·719$, $E = +·695$; $G = -·388$, $H = +·401$, $K = -·830$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Takamatu	0·2	11	0 11	+ 1	0 17	+ 1
Tokusima	0·5	94	0 2	−12	0 10	−13
Kôti	0·7	216	0 10	a P_g	0 15	−13
Sumoto	0·8	71	0 24	+ 6	0 37	+ 6
Muroto	0·9	170	0 18	− 2	0 28	S_g
Wakayama	1·0	82	0 25	+ 4	0 41	+ 5
Matuyama	1·1	256	0 17	k − 5	0 27	S_g
Kobe	1·2	59	0 35	+11	0 53	+12
Hirosima	1·3	282	0 18	− 7	0 33	−11
Osaka	1·3	66	0 34	+ 9	0 54	+10

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Tottori		1·4	8	0 31	+ 4	0 53	+ 7
Simidu		1·6	213	0 42	P_g	0 57	S_g
Siomisaki		1·6	114	0 35	P_g	0 58	S_g
Toyooka		1·6	25	0 44	+14	1 8	+17
Hamada		1·8	297	0 21	−11	0 52	− 4
Owase		1·8	91	0 41 a	P_g	1 8	S_g
Hikone		2·2	58	0 48	P_g	1 9	+ 3
Kameyama		2·2	70	0 50	P_g	1 17	S_g
Ooita		2·2	247	0 38	0	1 3	− 3
Tsuruga		2·3	47	0 50	P_g	1 24	S_g
Gihu		2·6	60	1 0	P_g	1 25	S_g
Nagoya		2·7	66	0 54	P_g	1 27	S_g
Hukuoka		3·0	260	0 52	+ 2	1 28	+ 1
Kumamoto		3·0	245	1 34	S	(1 34)	+ 7
Saga		3·2	256	1 17	P_g	—	—
Toyama		3·7	42	2 6	S_g	—	—
Hunatu		4·2	68	0 51	−16	1 30	−27

Feb. 23d. Readings also at 0h. (Seattle (2), Victoria (3), Fresno (2), Mineral (2), Reno (2), Pasadena, Riverside (2), China Lake (2), Tinemaha, Hungry Horse (2), Boulder City (2), Overton (2), Pierce Ferry (2), Logan, Rapid City, College, Besançon, Strasbourg, Prague (2), Jena, Collmberg, near Stuttgart, and near Manila), 1h. (Prague), 2h. (Tamanrasset, Seattle, Victoria, Fresno, Lick, Mineral, Reno, Mount Wilson, Riverside, Palomar, China Lake, Tinemaha, Hungry Horse, Boulder City, Overton, Pierce Ferry, Tucson, Logan, and Rapid City), 3h. (Pierce Ferry), 4h. (Seattle, Fresno, Mineral, Reno, China Lake, Hungry Horse, Boulder City, Overton, Pierce Ferry, Tucson, and Logan), 5h. (Samarkand, near Fergana, Andijan, Khorog, and Kulyab), 6h. (Apia, La Paz, Tchimkent, Andijan, Tashkent, Naryn, near Kulyab, Khorog, Samarkand, Fergana, near Gandzha, Akhalkalaki, and Tsikhlis-Dzhvari), 7h. (Apia, Naryn, Kulyab, Samarkand, near Fergana, Andijan, and Khorog), 9h. (Ottawa and near Andijan), 11h. (Tamanrasset, Pretoria, Helwan, Ksara, Huancayo, College, Hungry Horse, Almata II, Krasnogorka, near Kurmenty, Ili, near Andijan, and near Alicante), 12h. (Kew, Paris, Pretoria, near Manila, near Fergana, Andijan, and Kulyab), 14h. (Istanbul, College, Puebla (2), Tacubaya (2), Vera Cruz (2), and near Manila), 16h. (near Alicante (2)), 17h. (near Alicante), 19h. (Hungry Horse), 20h. (Pierce Ferry and near Santa Clara), 21h. (Boulder City and Pierce Ferry), 22h. (Boulder City and Pierce Ferry), 23h. (near Kurmenty).

Feb. 24d. 23h. 44m. 37s. Epicentre 38°·4S. 176°·5E. (as on 1950, April 12d.).

Intensity IV-V in North Island. Epicentre 38°·2N. 176°·4E.

R. C. Hayes.
Earthquake origins in New Zealand during year 1951. New Zealand Journal of Science and Technology, Sec. B, Vol. 34, No. 4, Jan., 1953, p.253.

$A = -·7842$, $B = +·0480$, $C = -·6186$; $\delta = -6$; $h = -1$;
$D = +·061$, $E = +·998$; $G = +·617$, $H = -·038$, $K = -·786$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Tuai	N.	0·6	128	e 0 16	+ 1	i 0 31	+ 5
Auckland	N.	2·0	318	—	—	i 0 54	− 8
New Plymouth	E.	2·0	251	i 0 39	+ 4	—	—
Wellington		3·2	205	e 0 50	− 2	i 1 33	+ 1
Cobb River	E.	3·9	226	e 1 0	− 2	e 1 53	+ 3
Kaimata		5·6	221	e 1 25	− 2	e 2 33	0
Christchurch		5·9	208	—	—	e 2 41	+ 1
Ottawa	Z.	127·5	58	e 18 45	[−22]	—	—

Feb. 24d. Readings also at 0h. (near Kurmenty (2)), 2h. (Manila and near Andijan), 3h. (Huancayo, La Paz, Tacubaya, La Plata, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Reno, Hungry Horse, Resolute Bay, near Grozny, Kirovobad, Leninakan, and Tiflis), 5h. (near Vladivostok), 6h. (Merida, Oaxaca, Puebla, Tacubaya, Ottawa, China Lake, Tucson, Boulder City, Overton, Pierce Ferry, Mineral, Hungry Horse, Victoria, and Tamanrasset), 7h. (Tamanrasset and Raciborzu), 8h. (La Paz), 9h. (near Akhalkalaki, Grandzha, and near Stuttgart (2)), 12h. (College), 13h. (near Istanbul), 14h. (Apia), 16h. (Bandong and Djakarta), 17h. (College), 19h. (Sofia and near Kurmenty), 20h. (Brisbane, Manila, and Kurmenty), 21h. (Ottawa, Hungry Horse, College (2), and near Istanbul).

Feb. 25d. 12h. 51m. 18s. Epicentre 37°·1N. 141°·8E. Depth of focus 0·005.
(as on 1951, Feb. 2d.).

Intensity V at Wakamatu, Semmaya; IV at Otsu, Hokota, Ichinoseki, Kawamata; II-III at Sendai, Maebasi, Mizusawa, and Miyako.
Epicentre 37°·0N. 141°·9E. Depth 40-50km.

Seismo. Bull, Cent. Met. Obs., Japan, for 1951. Tokyo, 1951, p.43, with macroseismic chart.

$A = -·6283$, $B = +·4944$, $C = +·6006$; $\delta = -9$; $h = -1$;
$D = +·618$, $E = +·786$; $G = -·471$, $H = +·371$, $K = -·800$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Onahama		0·8	257	0 7	−10	0 17	−12	—	—	—
Hukusima		1·2	302	0 22	0	0 37	− 1	—	—	—
Mito		1·3	236	0 19k	− 4	0 35	− 5	—	—	—
Sendai		1·3	329	0 24k	+ 1	0 45	+ 5	—	—	—
Shirakawa		1·3	271	0 11	−12	0 32	− 8	—	—	—
Inawashiro		1·4	289	0 12	−12	0 38	− 5	—	—	—
Tyosi		1·5	209	0 24	− 2	0 42	− 3	—	—	—
Yamagata		1·6	315	0 27	0	0 50	+ 3	—	—	—
Utunomiya		1·7	250	0 25	− 3	0 47	− 3	—	—	—
Kumagaya		2·1	244	0 32a	− 2	1 0	+ 1	—	—	—
Mizusawa		2·1	346	0 34	0	0 58	− 1	—	—	—
Tokyo		2·1	229	0 31	− 3	0 58	− 1	—	—	—
Maebasi		2·3	252	0 33k	− 4	1 4	0	—	—	—
Niigata		2·4	291	0 52	+14	1 19	+12	—	—	—
Yokohama		2·4	226	0 37	− 1	1 13	+ 6	—	—	—
Titibu		2·5	243	0 36	− 3	1 7	− 2	—	—	—
Miyako		2·6	3	0 39	− 2	1 7	− 5	—	—	—
Mera		2·7	216	0 43	+ 1	1 13	− 1	—	—	—
Morioka		2·7	349	0 41a	− 1	1 11	− 3	—	—	—
Oiwake		2·7	254	0 43	+ 1	1 19	+ 5	—	—	—
Hunatu		2·9	237	0 44	− 1	1 21	+ 2	—	—	—
Matusiro		2·9	259	0 45	0	1 22	+ 3	—	—	—
Aikawa		3·0	290	0 45	− 2	1 20	− 2	—	—	—
Osima		3·1	220	0 46	− 2	1 24	0	—	—	—
Toyama		3·4	266	0 58	+ 6	1 47	+15	—	—	—
Hatinohe		3·5	356	0 52	− 2	1 28	− 6	—	—	—
Shizuoka		3·5	234	0 47	− 7	1 36	+ 2	—	—	—
Iida		3·6	245	0 52	− 3	1 35	− 2	—	—	—
Aomori		3·8	348	1 0	+ 2	1 58	+16	—	—	—
Omaesaki		3·8	231	1 2	+ 4	1 54	+12	—	—	—
Wazima		3·9	277	1 2	+ 3	—	—	—	—	—
Hamamatu		4·1	235	1 8	+ 6	1 49	0	—	—	—
Kanazawa		4·2	264	1 4	+ 1	2 8	+16	—	—	—
Gihu		4·4	250	1 8	+ 2	2 0	+ 3	—	—	—
Nagoya		4·4	245	1 5	− 1	2 6	+ 9	—	—	—
Hukui		4·6	257	1 5	− 4	—	—	—	—	—
Hikone		4·8	250	1 13	+ 1	2 9	+ 2	—	—	—
Tsuruga		4·8	255	1 13a	+ 1	2 13	+ 6	—	—	—
Kameyama		4·9	245	1 16	+ 3	2 23	+14	—	—	—
Tu		4·9	243	1 3	−10	2 14	+ 5	—	—	—
Urakawa		5·1	8	1 17	+ 1	2 15	+ 1	—	—	—
Kyoto		5·3	249	1 19	0	2 33	+14	—	—	—
Owase		5·5	239	1 19	− 2	—	—	—	—	—
Osaka		5·6	247	1 47	+24	2 43	SS	—	—	—
Obihiro		5·9	10	1 48	+21	2 54	SS	—	—	—
Sapporo		6·0	356	1 35	+ 7	2 36	− 1	—	—	—
Sumoto		6·2	247	1 16	−15	3 0	+19	—	—	—
Nemuro		6·8	24	1 34	− 5	2 49	− 7	—	—	—
Takamatu		6·9	249	1 54	+13	3 26	+27	—	—	—
Koti		7·6	245	1 55	+ 5	3 43	SS	—	—	—
Ooita		9·2	249	2 25	+13	4 50	SSS	—	—	—
Vladivostok		9·7	312	i 2 18	− 1	i 4 16	+ 8	—	—	—
Saga		10·2	252	2 30	+ 4	—	—	—	—	—
Zi-ka-wei	z.	17·9	257	e 4 9	+ 3	7 36	SS	—	—	—
Nanking		19·6	263	e 4 27	+ 2	e 8 17	+19	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kabansk		28·8	312	e 5 54	0	—	—	—	—	—
Irkutsk		30·2	312	i 6 7	+ 1	—	—	—	—	—
Kurmenty		47·9	299	e 8 28	− 6	—	—	—	—	—
College		48·9	32	e 8 41	0	—	—	—	—	—
Andijan		52·8	297	e 9 13	+ 2	e 16 47	+14	—	—	—
Fergana		53·4	297	i 9 15	0	—	—	—	—	—
Tashkent		54·8	299	e 9 25	− 1	e 17 9	+ 9	—	—	—
Sverdlovsk		55·3	319	9 30	+ 1	17 15	+ 9	—	—	—
Kulyab		55·8	295	e 9 24?	− 9	—	—	—	—	—
Stalinabad		56·2	296	i 9 36	0	e 17 26	+ 8	—	—	—
Samarkand		57·1	298	e 9 37	− 5	—	—	—	—	—
Shasta Dam		70·8	53	e 11 11	− 1	—	—	—	—	—
Hungry Horse		71·5	42	e 11 16	0	—	—	—	—	—
Mineral	z.	71·5	53	e 11 15k	− 1	—	—	—	—	—
Berkeley	z.	72·4	56	e 11 20	− 1	—	—	—	—	—
Lick	z.	73·1	56	e 11 26k	+ 1	—	—	—	—	—
Reno	z.	73·1	53	e 11 26a	+ 1	—	—	e 11 52	pP	—
Fresno	z.	74·7	55	e 11 32a	− 2	—	—	—	—	—
Tinemaha	z.	75·5	54	i 11 40	+ 1	—	—	—	—	—
China Lake	z.	76·7	55	i 11 45	− 1	—	—	i 11 55	pP	—
Logan		76·7	47	e 11 46	0	—	—	—	—	—
Pasadena	z.	77·3	57	i 11 48	− 1	—	—	—	—	—
Riverside	z.	77·9	57	i 11 51	− 1	—	—	—	—	—
Copenhagen		78·0	334	i 11 54	+ 1	—	—	—	—	42·7
Overton	z.	78·3	53	i 11 56	+ 1	—	—	—	—	—
Boulder City		78·4	53	e 11 56	+ 1	—	—	—	—	—
Palomar	z.	78·6	57	i 11 55	− 1	—	—	—	—	—
Pierce Ferry		78·8	53	i 11 58	+ 1	—	—	—	—	—
Istanbul	z.	80·8	316	e 12 12	+ 4	—	—	—	—	—
Jena	E.	82·0	331	e 12 17	+ 3	—	—	—	—	—
Tucson		83·3	54	i 12 21	0	—	—	—	—	—
Stuttgart		84·7	330	e 12 29a	+ 1	—	—	—	—	e 46·7
Kew		85·9	337	—	—	e 35 58	Q	—	—	e 48·7
Tamanrasset	z.	107·6	317	e 18 15	[− 4]	—	—	—	—	—

Additional readings .—
Hungry Horse i = 12m.15s.
Mineral iZ = 11m.20s.
Berkeley eZ = 11m.29s. and 12m.47s.
Jena eN = 12m.20s.
Tucson e = 13m.22s.
Long waves were also recorded at Ksara, Rome, De Bilt, and Paris.

Feb. 25d. 15h. Undetermined shock.

Lenkoran P = 48m.43s., P_g = 48m.58s., S = 49m.34s.
Baku eP = 48m.59s.
Kirovobad eP = 49m.20s.
Nakhichevan P = 49m.31s.?, S = 50m.57s.
Grozny eP = 49m.51s.
Leninakan S = 49m.55s.
Erevan eS = 49m.56s.?.
Mary P = 50m.17s.
Ksara e = 51m.2s. and 55m.11s.
Tchimkent iP = 51m.10s.?.
Lunacharskoe eP = 51m.30s.
Andijan eP = 51m.33s., eS = 54m.53s.
Helwan PZ = 52m.0s., iZ = 53m.8s., eN = 55m.34s., eZ = 58m.13s.
Istanbul eZ = 52m.6s.
Krasnogorka eP = 52m.9s.?
Sverdlovsk P = 52m.32s., S = 56m.44s.
Copenhagen iP = 54m.23s.
Stuttgart eZ = 54m.23s. and 54m.30s.
Stalinabad iS = 54m.41s.
Tashkent S = 55m.18s.
Tamanrasset ePZ = 55m.35s.
Hungry Horse eP? = 61m.5s.

Feb. 25d. Readings also at 0h. (near Istanbul), 1h. (Apia, near Salo, Stuttgart, Basle, Chur, and Zürich), 2h. (Puebla, Tacubaya, Vera Cruz, Tucson, near Sofia, and Istanbul), 6h. (Fergana, Tashkent, near Almata II, Andijan, Frunse, Ili, Krasnogorka, Kurmenty, and Naryn), 7h. (near Auckland, Cobb River, Christchurch, Kaimata, New Plymouth, Tuai, Wellington, Messina, Ottawa, Overton, Pierce Ferry, and near Istanbul), 8h. (Mineral, Resolute Bay, and near Istanbul), 9h. (near Bogota, Chinchina, and near Alicante (4)), 10h. (Jena, Paris, Strasbourg, Stuttgart, and near Alicante), 11h. (Overton, College, and near Alicante), 14h. and 15h. (College), 16h. (Messina), 18h. (Pierce Ferry, Pretoria, Tucson, and near Tananarive), 19h. (Istanbul, Ksara, Nakhichevan, near Leninakan, and Tiflis), 20h. (Hungry Horse, College, and Tamanrasset), 21h. (Pretoria, near Athens, and near Apia), 22h. and 23h. (near Istanbul).

Feb. 26d. Readings at 0h. (Hungry Horse, Pierce Ferry, and Tamanrasset), 2h. (near Apia), 4h. (Apia, College, Hungry Horse, and Pavia), 5h. (College), 7h. (Tacubaya), 8h. (Apia, Tamanrasset, Overton, Mineral, and College), 9h. (College), 11h. (Apia and near Kurmenty), 12h. (Tucson), 13h. (Pretoria), 14h. (Huancayo, La Paz, San Juan, China Lake, Tucson, Boulder City, Hungry Horse, (2) College, and near Kurmenty), 15h. (College, near Apia, near Vladivostok, and near Kurmenty), 16h. (Shasta Dam, Hungry Horse, College, Ottawa, Kirovobad, near Kurmenty (2), and near Messina), 17h. (La Paz, near Huancayo, and near Chatra), 18h. (Apia, and near Chatra), 19h. (Overton, Ottawa, Jena, Prague, Basle, near Collmberg, Stuttgart, Zürich, near Erevan, Grozny, Kirovobad, Leninakan, Tiflis, near Almata II, Ili, and Kurmenty), 20h. (Brisbane, Manila, College, and Sverdlovsk), 21h. (Tucson).

Feb. 27d. 22h. 59m. 1s. Epicentre 41°·2N. 142°·5E. Depth of focus 0·005.
(as on 1949, July 18d.).

Intensity V at Gonohe; IV at Hatinohe, Sannohe, Omisawa, and Sibutami; II-III at Urakawa, Aomori, Morioka, Tomari, and Hukuoka.
Epicentre 41°·1N. 142°·6E. Depth 40km.

The Seismological Bulletin of the C.M.O., Japan, for Feb., 1951, Tokyo, 1951, p.45, with macroseismic chart.

$A = -\cdot5987$, $B = +\cdot4594$, $C = +\cdot6561$; $\delta = -4$; $h = -2$;
$D = +\cdot609$, $E = +\cdot793$; $G = -\cdot521$, $H = +\cdot399$, $K = -\cdot755$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Hatinohe		1·0	228	0 17 a	− 2	0 29	− 4
Aomori		1·4	254	0 24	0	0 41	− 2
Miyako		1·6	194	0 26	− 1	0 45	− 2
Muroran		1·6	315	0 27	0	0 38	− 9
Morioka		1·8	214	0 29 a	− 1	0 51	− 1
Obihiro		1·8	17	0 34	+ 4	0 48	− 4
Sapporo		2·1	335	0 33 a	− 1	0 56	− 3
Kusiro		2·3	38	0 36	− 1	0 57	− 7
Mizusawa		2·3	207	0 37	0	1 4	0
Akita		2·4	231	0 45	+ 7	1 21	+14
Nemuro		3·1	47	0 46	− 2	1 18	− 6
Sendai		3·2	203	0 50	+ 1	1 22	− 5
Yamagata		3·4	210	1 43	S	(1 43)	+11
Hukusima		3·8	206	0 55	− 3	1 46	+ 4
Inawasiro		4·1	208	1 6	+ 4	2 3	+14
Onahama		4·4	197	0 53	−13	—	—
Shirakawa		4·4	204	1 10	+ 4	1 59	+ 2
Utunomiya		5·1	205	1 14	− 2	2 2	−12
Tukubasan		5·4	203	1 22	+ 2	2 14	− 8
Maebasi		5·5	210	1 25	+ 4	2 33	+ 9
Kumagaya		5·6	207	1 27	+ 4	2 34	+ 7
Tokyo		5·9	202	1 28	+ 1	2 31	− 3
Matumoto		6·1	217	1 42	+12	—	—
Kohu		6·3	210	1 44	+12	2 59	+15
Hunatu		6·4	208	1 39	+ 5	2 55	+ 9
Nagoya		7·4	218	1 30	−18	—	—
College		45·2	35	e 8 13	0	—	—
Hungry Horse		68·2	45	i 10 55	− 1	—	—
Collmberg	z.	77·9	330	e 12 8	pP	—	—
Stuttgart	z.	81·4	331	e 12 28	pP	—	—
Pavia		84·4	329	e 9 11	?	—	—

College gives also i = 8m.49s.

Feb. 27d. Readings also at 0h. (College, Tchimkent, Lunacharskoe, Frunse, near Khorog, Kulyab, Stalinabad, Fergana, Andijan, and Samarkand), 2h. (Bandong and Djakarta), 3h. (College, Krasnogorka, and near Kurmenty), 5h. (Overton), 6h. College, Kulyab, Fergana, near Naryn, Rybach'e, Andijan, Frunse, Kurmenty, Almata II, Ili, and near Apia), 7h. (Andijan), 8h. (College (2), and near Andijan), 9h. (College, Boulder City, and near Mizusawa), 10h. (near Andijan), 11h. (near Apia), 12h. (near Andijan), 13h. (Christchurch and Wellington), 15h. (Stuttgart), 16h. (Manila and College), 17h. (Boulder City and Wellington), 18h. (Istanbul, Ottawa, Palisades, Seattle, Hungry Horse, and near Tucson), 19h. (Weston and Upsala), 22h. (College and near Istanbul (2)), 23h. (Lick, Mineral, College, and near Basle).

Feb. 28d. Readings also at 1h. (Cobb River, Kaimata, Tuai, Wellington, Auckland, Riverside, China Lake, Tinemaha, Tucson, Pierce Ferry, College, and Collmberg), 3h. (Hungry Horse, Almata, and near Kurmenty), 5h. (Washington, Berkeley, and Stuttgart), 6h. (College and near Apia), 8h. (Mizusawa, Almata, Andijan, near Rybach'e, Naryn, Almata II, Ili, Kurmenty, near Basle, Zürich (Intensity IV at Leukerbad), and near Alicante), 9h. (Apia), 10h. (Stuttgart), 13h. (Wellington), 15h. (Ottawa), 16h. (Lick, and near Alicante), 17h. (near Alicante), 18h. (Collmberg), 19h. (near Shasta Dam, near Kurmenty, near Gandzha, Akhalkalaki, and Tsikhlis-Dzhvari), 29h. (Messina, and near Klyuchi), 21h. (Pierce Ferry), 22h. (Huancayo).

March 1d. Readings at 1h. (Palomar, China Lake, Tucson, Boulder City, Hungry Horse, College, Granada, Collmberg, Klyuchi, Yuzno-Sakhlinsk, near Apia, and near Istanbul), 7h. (Apia), 9h. (Zabrze, Raciborzu, Collmberg, Prague, Jena, and Chatra), 12h. (College, Hungry Horse, and Tamanrasset), 15h. (Borzhomi, near Gandzha, Akhalkalaki, Tsikhlis-Dzhvari, and near Almata II), 16h. (College and Hungry Horse), 18h. (College, Hungry Horse, Boulder City, Tucson, Overton, Pierce Ferry, China Lake, near Puebla, Oaxaca, Vera Cruz, and Tacubaya), 20h. (Yuzno-Sakhlinsk, Klyuchi, Collmberg, Stuttgart, and College), 22h. (Bucharest), 23h. (Belgrade, Collmberg, Strasbourg, Zürich, Stuttgart, Jena, and Reno).

March 2d. 0h. 34m. 21s. Epicentre 15°·5N. 91°·7W. Depth of focus 0·015.
(as on January 29d.).

$A = -\cdot0286$, $B = -\cdot9637$, $C = +\cdot2656$; $\delta = +8$; $h = +6$;
$D = -1\cdot000$, $E = +\cdot030$: $G = -\cdot008$, $H = -\cdot265$, $K = -\cdot964$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca		5·1	289	1 15	− 1	2 23	+ 9	—	—	—
Vera Cruz		5·6	312	e 1 22	0	e 2 32	+ 6	e 2 13	?	—
Merida		5·8	21	1 24	− 1	2 31	0	—	—	—
Puebla		7·1	301	e 1 43	0	e 3 7	+ 5	—	—	—
Tacubaya		8·1	300	e 1 56	0	i 3 36	+ 9	—	—	—
Guadalajara		12·2	297	—	—	e 5 42	sS	—	—	—
Bogota	z.	20·4	119	e 4 40	+11	e 8 33	+28	—	—	—
Tucson		24·1	318	e 5 7	+ 2	—	—	i 5 33	pP	e 13·0
Washington	z.	26·6	26	e 7 4	?	—	—	—	—	—
Pierce Ferry		28·6	320	e 6 17	pP	—	—	—	—	—
Boulder City		29·0	319	e 5 49	− 1	—	—	i 6 19	pP	—
Overton	z.	29·1	320	i 6 23	pP	—	—	—	—	—
Riverside	z.	29·6	314	e 6 24	pP	—	—	—	—	—
China Lake	z.	30·7	317	e 6 35	pP	—	—	i 6 46	sP	—
Logan		31·4	331	e 6 55	sP	—	—	—	—	—
Tinemaha	z.	31·9	318	e 6 46	pP	—	—	e 6 57	sP	—
Ottawa	z.	32·7	21	6 57	pP	—	—	—	—	—
Shawinigan Falls	N.	34·8	23	e 7 15	pP	—	—	—	—	—
Hungry Horse		37·6	336	e 7 35	pP	—	—	i 9 18	PcP	—
Victoria	z.	41·9	329	e 7 38	− 1	—	—	—	—	—
College		62·0	337	e 10 7	− 2	—	—	e 10 45	pP	—
Tamanrasset	z.	90·5	66	e 12 53	+ 5	—	—	e 13 28	pP	—

Additional readings :—
Tucson i = 6m.20s., iPcP = 8m.45s.
College i = 11m.23s.

March 2d. 1h. 32m. 37s. Epicentre 53°·1N. 35°·1W. (as on 1950, December 19d.).

A = +·4933, B = −·3467, C = +·7977 ; δ = −13 ; h = −7 ;
D = −·575, E = −·818 ; G = +·653, H = −·459, K = −·603.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rathfarnham Castle		17·0	77	i 4 7	+ 6	e 7 6	− 4	e 8 30	Q	e 9·1
Aberdeen	E.	19·2	64	i 4 45	PP	e 7 59	0	i 8 22	SS	9·8
Kew		21·2	80	i 4 50	+ 1	i 8 51	+10	i 5 4	PP	e 10·4
Seven Falls	E.	23·5	271	5 12	0	9 35	+12	—	—	12·2
Paris		23·9	85	i 5 16	0	—	—	e 5 47	PP	e 11·4
De Bilt		24·3	75	e 5 23	+ 3	e 9 48	+11	—	—	e 12·4
Clermont-Ferrand		25·7	91	e 5 6	−27	—	—	—	—	e 13·0
Weston		26·3	262	i 5 38	− 1	—	—	—	—	e 13·7
Harvard		26·4	262	i 5 39	− 1	—	—	—	—	e 15·1
Besançon		26·7	85	e 5 49	+ 6	—	—	—	—	—
Granada		27·0	113	5 52a	+ 7	10 22	0	—	—	13·1
Strasbourg		27·1	82	e 5 47	+ 1	e 10 28	+ 4	—	—	e 13·4
Stuttgart		27·9	80	e 5 53	− 1	—	—	e 14 17	Q	15·2
Alicante		28·0	107	6 4	+ 9	10 48	+10	9 18	PcP	e 13·9
Zürich		28·2	84	e 5 53	− 3	—	—	—	—	—
Jena		28·4	76	e 5 58	0	—	—	e 7 3	PPP	—
Collmberg	Z.	29·1	74	e 6 4	0	—	—	—	—	—
Resolute Bay		31·8	336	6 28	0	11 51	+13	7 40	PP	e 17·6
Cleveland	E.	33·0	269	e 6 38	− 1	—	—	e 9 58	?	—
Morgantown		33·2	264	e 6 40	0	—	—	—	—	—
Columbia		37·6	259	i 7 23	+ 5	—	—	—	—	—
Messina	E.	37·6	92	—	—	e 13 23?	+15	—	—	—
St. Louis		40·0	273	e 7 38	0	e 13 55	+11	e 15 41	?	—
Tamanrasset	Z.	43·1	119	e 8 5	+ 1	—	—	e 9 51	PP	—
Hungry Horse		47·8	299	e 8 36	− 5	—	—	i 10 8	PcP	—
Logan		50·7	291	e 9 3	0	—	—	—	—	—
Sverdlovsk		50·7	45	9 1	− 2	e 16 21	+ 3	—	—	—
College		51·5	331	e 9 8	− 1	—	—	e 11 13	PP	e 26·5
Ksara		52·7	82	e 9 23	+ 5	—	—	—	—	—
Overton	Z.	55·8	288	i 9 40	− 1	—	—	—	—	—
Pierce Ferry		55·8	287	e 9 39	− 2	—	—	—	—	—
Boulder City		56·4	287	e 9 43	− 2	—	—	—	—	—
Reno	Z.	56·7	294	e 9 47k	− 1	—	—	—	—	—
Tucson		56·7	281	i 9 47	− 1	—	—	e 11 56	PP	e 31·5
Mineral	Z.	57·1	295	e 9 48k	− 2	—	—	i 9 54	P	—
Tinemaha	Z.	57·6	290	e 9 52	− 2	—	—	—	—	—
China Lake	Z.	58·1	289	i 9 56	− 2	—	—	—	—	—
Fresno	Z.	58·7	291	e 10 0a	− 2	—	—	—	—	—
Riverside	Z.	59·2	288	e 10 5	0	—	—	—	—	—
Mount Wilson	Z.	59·5	288	i 10 9	+ 2	—	—	—	—	—
Andijan		67·6	52	e 11 2	+ 1	—	—	—	—	—
Fergana		67·6	52	e 11 0	− 1	—	—	—	—	—
Stalinabad		67·6	55	e 11 1	0	—	—	—	—	—

Additional readings :—
Rathfarnham Castle iZ = 4m.10s., 6m.4s., and 6m.18s.
Aberdeen iSSE = 8m.46s.
Kew eSSZ = 9m.53s.
Paris i = 5m.31s., e = 5m.57s., i = 8m.22s.
Strasbourg e = 6m.6s. and 8m.27s.
Alicante Q = 12m.4s.
Jena eEN = 6m.12s., eE = 7m.37s.
Resolute Bay eEN = 14m.17s.
College i = 9m.13s., ePcP = 10m.12s.
Long waves were also recorded at Copenhagen, Almeria, Pavia, Rome, Triest, Ottawa, Shawinigan Falls, Palisades, and Philadelphia.

March 2d. Readings also at 0h. (Hungry Horse, Triest, Stalinabad, Fergana, Tchimkent, Andijan, near Khorog, and Kulyab), 1h. (College, Pretoria, La Paz, Tucson, Boulder City, Overton, Logan, Mount Wilson, Riverside, China Lake, Tinemaha, Lick, Mineral, Reno, Shasta Dam, Hungry Horse (2), Tamanrasset (2), and Collmberg), 2h. (Strasbourg, near Bogota, and near Chinchina), 4h. (Collmberg, Stuttgart, Triest, College, and Washington), 5h. (College, Hungry Horse (2), Tucson, Aberdeen, Kew, De Bilt, and Pavia), 6h. (Collmberg (2) and Stuttgart), 9h. (Collmberg, near Krasnogorka, and near Athens), 11h. (near La Paz), 12h. (Pretoria, Tamanrasset, and Helwan), 13h. (near Chatra), 14h. (College, Apia, Andijan, Naryn, near Khorog, Kulyab, Stalinabad, and Fergana), 18h. (near Chatra), 21h. (Kew), 22h. (College, near Gandzha, Akhalkalaki, and Tsikhlis-Dzhvari), 23h. (near Akhalkalaki).

March 3d. 21h. 41m. 23s. Epicentre 41°·8N. 44°·3E. (as on 1940, May 23d.).

U.S.S.R. suggest epicentre 41°·9N. 44°·5E.

$A = +\cdot5351$, $B = +\cdot5222$, $C = +\cdot6641$; $\delta = +5$; $h = -2$;
$D = +\cdot698$, $E = -\cdot716$; $G = +\cdot475$, $H = +\cdot464$, $K = -\cdot748$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Gori		0·2	323	i 0 7	P*	i 0 11	S*	—	—	—
Tiflis		0·4	103	i 0 7	P_g	i 0 11	S_g	—	—	—
Gandzha		0·6	223	i 0 15	0	—	—	—	—	—
Tsikhlis-Dzhvari		0·6	263	i 0 16	+ 1	i 0 28	+ 2	—	—	—
Akhalkalaki		0·7	237	i 0 18	+ 1	—	—	—	—	—
Borzhomi		0·7	273	i 0 18	+ 1	i 0 30	+ 2	—	—	—
Abastumanj		1·1	267	i 0 23	P_g	i 0 39	0	—	—	—
Leninakan		1·1	199	e 0 24	+ 2	e 0 40	+ 1	—	—	—
Erevan		1·6	175	e 0 32	P_g	0 56	S_g	—	—	—
Grozny		1·8	35	i 0 33	P*	—	—	—	—	—
Kirovobad		1·9	124	0 34	0	—	—	—	—	—
Piatigorsk		2·4	338	—	—	1 15	S*	—	—	—
Lenkoran		4·6	129	—	—	2 18	S*	—	—	—
Yalta		7·9	294	1 55	− 4	3 24	− 6	—	—	—
Ksara		10·4	222	—	—	e 4 43	SS	—	—	—
Collmberg	z.	23·4	305	e 5 10	− 1	—	—	e 5 19	P	—
Stuttgart	z.	25·5	299	e 5 29	− 3	—	—	—	—	—
Tamanrasset	z.	37·5	253	i 7 16k	− 1	—	—	e 7 22	P	—
Hungry Horse		88·2	346	e 12 51	− 3	—	—	—	—	—

March 3d. Readings also at 0h. (Raciborzu and near Akhalkalaki), 1h. (Collmberg, Krasnogorka, Almata II, and near Naryn), 2h. (near Kulyab), 4h. (College and near Apia), 5h. (near Apia), 6h. (College and Chatra), 7h. (College), 9h. (near Basle, Neuchatel, and Zürich), 10h. (Tacubaya, Puebla, Merida, Oaxaca, College (2), Hungry Horse, and Ksara), 11h. (Apia and Collmberg), 12h. (Pretoria, College, and near Ili), 13h. (China Lake and Collmberg), 16h. (Almata II, Ili, Tchimkent, near Andijan, Fergana, Khorog, Stalinabad, and Pierce Ferry (2)), 17h. (Boulder City and Overton), 18h. (Christchurch, Riverview, Wellington, College, Stuttgart, Tamanrasset, Apia, Boulder City, Overton, Tucson, Tinemaha, Pasadena, China Lake, Berkeley, Vera Cruz, near Tacubaya, and Puebla), 19h. (Bombay), 20h. (near Akhalkalaki, Gandzha, Tsikhlis-Dzhvari, Ottawa, near Merida (2), Tamanrasset, and Pretoria), 21h. (Puebla, Tacubaya, and Vera Cruz), 22h. (Pierce Ferry), 23h. (near Almata II).

March 4d. 3h. 22m. 2s. Epicentre 44°·0N. 16°·8E. (as on February 17d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Belgrade	z.	2·7	73	e 0 47a	+ 2	e 1 24	+ 5	e 0 56	P_g	—
Taranto		3·5	174	1 14	P_g	e 1 54	S_g	—	—	—
Chur		5·8	301	e 1 30k	+ 1	e 2 48	+10	—	—	—
Prague		6·3	346	e 2 34	+58	e 3 8	+18	e 3 12	S_g	—
Zürich		6·6	303	e 1 42	+ 1	e 3 12	+14	—	—	—
Stuttgart	z.	7·1	315	e 1 44	− 4	e 3 12	+ 2	e 4 0	S_g	—
Basle		7·4	303	e 1 50	− 2	—	—	e 2 32	P_g	—
Collmberg	z.	7·7	343	e 2 25?	P_g	e 3 53	S*	e 4 22	S_g	—
Jena		7·8	334	e 1 58?	0	e 3 32	+ 4	e 3 59	S*	—
Strasbourg		7·8	310	e 3 47	S*	e 4 13	S_g	—	—	—
Besançon		8·3	298	—	—	e 3 49	+ 9	e 4 20	S*	—

For Notes see next page.

NOTES TO MARCH 4d. 3h. 22m. 2s.

Additional readings :—
Belgrade eZ = 1m.10s. and 1m.36s., eNE = 1m.44s.
Prague e = 3m.24s., eS_g = 3m.35s.
Stuttgart eZ = 1m.50s., eS_gZ = 4m.12s., eZ = 4m.31s.
Collmberg eZ = 3m.2s.?
Jena eN = 3m.7s. and 4m.15s., eE = 4m.30s., eN = 4m.33s.
Strasbourg eS_g? = 4m.32s.

March 4d. 11h. 17m. 24s. Epicentre 16°·0S. 74°·5W. Depth of focus 0·005.

Intensity V-VI at Caraveli ; V at Chala and Chuquibamba ; IV-V at Camaná ; IV at Lomas, Ica, and Pisco ; II-III at Lima.
Epicentre 16°S. 74°W. ; focal depth 150km.

E. Silgado.
Datos sismológicos del Perú, 1951, Boletin No. 8, Lima, 1953, p.11.

A = +·2570, B = −·9268, C = −·2739 ; δ = +3 ; h = +6 ;
D = −·964, E = −·267 ; G = −·073, H = +·264, K = −·962.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		4·0	348	i 1 3	+ 2	e 1 48	+ 1	—	—	—
La Paz		6·2	96	i 1 30a	− 1	i 2 44	+ 3	i 1 44	PP	3·0
Bogota		20·5	2	i 4 36	+ 1	i 8 23	+ 7	i 5 12	pP	—
Chinchina		20·8	358	i 4 33	− 5	i 8 22	+ 1	i 4 59	pP	i 10·3
La Plata		24·0	144	i 5 10	0	9 12	− 7	—	—	11·9
Balboa Heights		25·3	350	i 5 25	+ 3	—	—	—	—	e 10·8
San Juan		35·1	15	i 6 44	− 5	e 12 6	−10	i 7 14	pP	e 13·8
Merida		39·6	338	e 7 34	+ 7	—	—	—	—	—
Vera Cruz		40·9	329	e 7 52	+15	—	—	—	—	—
Puebla		41·9	326	e 7 53	+ 7	—	—	—	—	—
Tacubaya		42·7	325	e 7 57	+ 5	e 15 0	?	—	—	—
Columbia		50·1	354	i 8 50	− 1	e 16 17	+21	i 9 14	pP	e 24·0
Little Rock		53·3	342	i 9 15	0	e 17 11	pS	i 9 42	pP	—
Washington	z.	54·7	358	i 9 23	− 2	i 17 36	pS	i 12 4	PP	—
Cincinnati		55·6	352	i 9 30	− 1	i 17 10	0	i 9 56	pP	—
Morgantown		55·6	356	i 9 30	− 1	—	—	e 9 48	pP	—
Philadelphia		55·7	359	e 9 30	− 2	e 17 11	− 1	i 9 57	pP	e 23·2
Lubbock		55·8	333	9 32	− 1	—	—	—	—	—
St. Louis		56·3	346	i 9 35	− 1	e 17 20	0	i 10 2	pP	—
Florissant		56·5	346	i 9 37	− 1	e 17 22	0	i 10 4	pP	—
Fordham		56·6	2	i 9 37	− 2	e 17 27	+ 3	i 10 4	pP	—
Pennsylvania		56·6	357	i 9 38	− 1	e 18 28	+64	i 10 50	sP	—
Palisades		56·7	2	i 9 37	− 2	e 17 22	− 3	i 10 3	pP	e 26·2
Cleveland		57·6	354	i 9 47	+ 1	i 17 55	+18	i 10 5	pP	i 29·9
Weston		58·2	4	i 9 48	− 2	—	—	i 12 22	PP	—
Harvard		58·3	4	i 9 49	− 1	e 10 21	PcP	i 10 15	pP	e 27·5
Chicago		58·8	349	e 9 49	− 5	e 17 47	− 6	e 10 15	pP	e 24·1
Tucson		59·3	325	i 9 58	+ 1	e 18 32	pS	i 10 24	pP	e 25·3
Lincoln	E.	60·2	341	e 10 3	− 1	e 18 33	+22	e 10 32	pP	e 23·7
Ottawa		61·1	359	e 10 8	− 2	e 18 25	+ 3	e 18 54	pS	—
Shawinigan Falls	N.	62·3	3	e 10 22	+ 4	—	—	e 13 59	PPP	—
Seven Falls	E.	62·9	4	e 10 16	− 6	e 18 36	− 9	—	—	29·6
Palomar		63·6	322	i 10 29k	+ 3	i 10 56	sP	i 10 47	pP	—
Pierce Ferry		63·9	325	e 10 29	+ 1	e 19 27	+30	i 10 56	pP	—
Boulder City		64·2	325	i 10 33	+ 3	—	—	i 10 58	sP	—
Riverside	z.	64·3	321	i 10 33k	+ 2	i 10 58	sP	e 10 48	pP	—
Overton	z.	64·4	325	i 10 33	+ 1	—	—	i 11 2	pP	—
Pasadena		64·9	321	i 10 37k	+ 2	e 19 17	+ 7	i 10 54	pP	e 32·1
China Lake		65·7	323	i 10 42k	+ 2	i 11 7	sP	i 11 0	pP	—
Salt Lake City		66·3	330	e 10 39	− 5	e 19 42	+15	e 11 6	pP	e 26·9
Tinemaha		66·9	323	i 10 49k	+ 2	i 11 16	sP	i 11 8	pP	—
Logan		67·0	331	i 10 49	+ 1	e 19 55	+20	i 11 16	pP	e 36·6
Fresno	z.	67·6	322	e 10 53a	+ 1	—	—	e 39 8	P'P'	—
Lick	z.	69·1	321	i 11 4k	+ 3	i 11 25	PcP	i 11 31	pP	—
Santa Clara		69·3	321	e 11 6	+ 4	i 11 29	sP	i 11 20	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bozeman		69·7	334	e 11 4	− 1	e 20 10	+ 3	e 26 12	SS	e 34·2
Berkeley		69·9	321	i 11 9k	+ 3	e 20 18	+ 8	i 11 36	pP	e 34·8
Butte		70·6	333	e 11 39	pP	e 20 40	pS	—	—	e 36·9
Mineral	Z.	71·1	324	i 11 14k	+ 1	—	—	i 11 27	pP	—
Shasta Dam		71·8	324	i 11 19	+ 1	i 11 36	PcP	i 11 45	pP	—
Hungry Horse		73·1	334	i 11 25	0	i 11 46	PcP	i 11 55	pP	—
Seattle		76·4	329	e 12 6?	pP	—	—	—	—	—
Victoria	Z.	77·5	329	e 11 52	+ 2	—	—	—	—	—
Malaga		84·3	50	i 12 26	0	e 22 41	− 4	—	—	e 40·6
Granada		85·0	50	i 11 36k	?	i 22 53	+ 1	i 12 32	P	45·6
Almeria		85·7	50	i 12 31	− 2	i 23 25	sS	16 7	PP	48·4
Toledo		85·8	47	i 12 35	+ 1	e 23 6	+ 6	23 33	sS	42·3
Tamanrasset	Z.	87·2	66	i 12 41a	+ 1	e 24 7	SP	i 13 5	pP	—
Alicante		87·8	49	e 12 30	−13	23 11	− 8	16 10	PP	e 41·9
Tortosa	E.	89·4	48	e 12 56	+ 5	i 24 12	SP	—	—	—
Algiers Univ.	Z.	89·8	52	e 12 51	− 2	—	—	—	—	—
Rathfarnham Castle		90·3	34	e 12 55	0	e 23 24	[+ 5]	i 14 37	pP	—
Resolute Bay		91·4	355	13 0	0	e 23 54	+ 3	13 29	pP	—
Kew		92·9	37	i 13 7	0	e 24 8	+ 3	e 24 42	sS	e 42·6
Scoresby Sund		93·5	16	e 13 10	0	e 24 1	− 9	—	—	44·6
Paris		93·6	40	e 13 10	0	—	—	—	—	e 45·6
Aberdeen	E.	94·1	32	—	—	i 24 11	− 4	i 26 2	PPS	e 45·2
Pretoria	Z.	94·1	118	i 13 3	− 9	—	—	—	—	—
De Bilt		96·3	38	—	—	e 24 0	[+ 8]	—	—	e 46·6
Strasbourg		96·8	42	e 13 26	+ 1	e 24 0	[+ 5]	e 13 57	pP	e 44·6
Karlsruhe	Z.	97·4	41	e 13 27	− 1	—	—	—	—	—
College		97·5	336	i 13 28	0	e 24 3	[+ 5]	i 13 57	pP	e 38·3
Stuttgart		97·8	42	e 13 28	− 1	e 24 36	SKKS	e 13 49	pP	e 51·6
Rome		98·3	49	e 13 30	− 2	24 24	SKKS	17 23	PP	—
Messina		99·7	53	e 17 1	PP	e 24 4	[− 5]	e 30 15	PKKP	—
Jena		99·8	40	e 13 38	0	—	—	e 14 23	sP	—
Triest		100·1	45	e 17 48	PP	e 24 5	[− 6]	e 24 56	S	—
Collmberg	Z.	100·8	40	e 13 42	− 1	—	—	e 17 46	PP	—
Prague		101·4	41	e 13 51	+ 5	e 14 38	sP	e 14 22	pP	—
Helwan	N.	111·3	64	—	—	e 26 50	S	e 27 22	sS	—
Riverview		114·1	221	—	—	e 29 12	PS	e 35 25	SS	e 53·4
Moscow		115·5	36	19 4	PP	—	—	—	—	—
Sverdlovsk		127·1	29	i 21 29	PP	—	—	—	—	—
Mary		136·0	52	i 19 18	[+ 4]	—	—	—	—	—
Tchimkent		139·6	42	e 19 23	[+ 3]	—	—	—	—	—
Tashkent		139·9	43	e 19 25	[+ 4]	e 22 59	PKS	e 22 5	PP	—
Stalinabad		140·8	47	i 19 26	[+ 3]	e 40 54	SS	e 19 46	pPKP	—
Kulyab		141·7	48	e 19 34	[+10]	—	—	—	—	—
Fergana		142·0	43	e 19 14	[−11]	—	—	—	—	—
Andijan		142·2	43	e 19 25	[0]	—	—	e 19 46	pPKP	—
Khorog		143·2	48	e 19 39	[+12]	—	—	—	—	—
Almata		143·5	35	i 19 30	[+ 3]	—	—	—	—	—
Almata II		143·8	35	e 19 28	[0]	—	—	—	—	—
Irkutsk		143·8	2	e 19 26	[− 2]	e 26 21	[− 8]	e 22 39	PP	—
Kabansk		144·0	0	19 30	[+ 2]	23 9	PKS	22 42	PP	—
Vladivostok		144·8	326	i 19 30	[0]	i 29 37	SKKS	i 19 53	pPKP	—
Bombay		148·7	79	e 19 47	[+11]	e 42 43	SS	—	—	—
Poona		149·7	80	i 19 41	[+ 3]	—	—	—	—	—

Additional readings :—
La Paz iPP = 2m.8s.
Bogota isSEN = 9m.5s.
La Plata S?E = 8m.48s., SE = 9m.15s.
San Juan iPP = 8m.6s., i = 8m.56s.
Columbia ePP = 10m.46s., ipPP = 11m.16s., isS = 16m.47s., i = 19m.7s., iSS = 19m.58s.
Washington i = 9m.36s.
Philadelphia ePP? = 12m.2s., i = 17m.32s., isS = 17m.59s., eSS = 20m.59s.
St. Louis i = 9m.53s., e = 17m.40s., esS = 18m.10s.
Florissant esS = 18m.9s., e = 19m.20s. and 19m.53s.
Pennsylvania iN = 10m.2s., eN = 17m.46s., iEN = 18m.54s., iE = 19m.17s., eSS?N = 21m.46s.

Continued on next page.

Palisades isP? =10m.33s., ePP =11m.44s.
Cleveland epPN =10m.8s., eN =10m.14s., ePPN =11m.58s., epPPN =12m.22s., ePPPN =13m.24s., ipPPPN =13m.46s., eN =19m.54s.
Weston i =10m.12s.
Harvard i =10m.8s., e =10m.45s. and 11m.25s., i =11m.45s., iPP =12m.23s., eScP = 14m.21s.
Chicago ePPP =13m.35s., eScS? =19m.37s., i =20m.9s.
Tucson ePP? =11m.54s., esS =18m.39s.
Ottawa e =21m.50s. and 23m.36s.
Palomar iZ =11m.21s., ePKP,PKPZ =39m.28s.
Pierce Ferry ePP =13m.4s., epPP =13m.19s., ePKP,PKP =39m.22s.
Overton iZ =10m.53s., iPKP,PKPZ =39m.25s.
Pasadena iZ =10m.50s., isPEZ =11m.1s., iPPZ =12m.59s., iSEN =19m.49s., ePKP, PKPZ =39m.26s.
China Lake iZ =12m.36s., ePKP,PKPZ =39m.31s.
Salt Lake City ePP? =13m.4s.
Tinemaha ePKP,PKPZ =39m.1s.
Logan epPP =13m.47s., esS =20m.7s.
Berkeley iPcPZ =11m.27s., isPZ =11m.55s., eZ =12m.6s., 13m.22s., 14m.21s., and 16m.22s., eScSEN =20m.48s., esSZ =21m.2s.
Granada sP =14m.11s., sS =23m.25s.
Almeria PPP =18m.7s., SS =29m.43s.
Toledo e =12m.57s., i =13m.13s., ePP =15m.56s.
Tamanrasset ePPZ =16m.57s., ePPPZ =17m.50s.
Alicante PS =24m.22s., SSS =31m.20s., Q =33m.44s.
Rathfarnham Castle ePPZ =17m.3s., eZ =18m.16s., eEN =26m.36s., eSSEN =30m.6s.
Resolute Bay PPNZ =16m.40s., eNZ =17m.3s. and 18m.43s., eN =23m.26s. and 23m.43s., eEN =24m.27s. and 24m.51s., eNZ =25m.13s., 25m.41s., and 30m.30s.
Scoresby Sund i =24m.13s.
Aberdeen iE =29m.59s.
Strasbourg e =16m.54s., ePS =26m.24s.
College i =13m.47s., ePP =17m.26s., epPP =17m.52s.
Stuttgart eS =25m.14s., ePS =26m.39s., eSS =32m.0s.
Rome PPS =26m.41s., SS? =31m.17s.
Messina e =26m.16s. and 61m.21s.
Triest esS =26m.6s., ePS =26m.29s., eSS =32m.25s.
Prague e =14m.47s., ePP =17m.58s. and 18m.10s., esPP =18m.45s., e =19m.16s. and 20m.51s.
Helwan eZ =28m.38s. and 29m.45s.
Riverview ePS?E =29m.17s.
Stalinabad ePP =22m.26s., ipPP =22m.52s.
Irkutsk ePKS =23m.2s., ePPP =25m.51s., eSKSP =32m.54s.
Kabansk SKSP =32m.36s.
Vladivostok ePP =22m.46s., iPKS =23m.14s., iPPP =26m.5s., ePS =33m.31s., SS = 41m.18s.
Long waves were also recorded at Saskatoon, Wellington, and Clermont-Ferrand.

March 4d. 15h. 17m. 6s. Epicentre 35°·1N. 142°·0E.

Epicentre given by Seismo. Bull. Cent. Met. Obs., Japan, 1951, Tokyo, 1951.

$A = -·6462$, $B = +·5048$, $C = +·5724$; $\delta = +4$; $h = 0$;
$D = +·616$, $E = +·788$; $G = -·451$, $H = +·352$, $K = -·820$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Tyosi	1·1	304	0 23	+ 1	0 39	0
Mera	1·8	264	0 42	P_g	—	—
Mito	1·8	316	0 31	− 1	0 53	− 3
Tokyo	1·9	288	0 38	+ 4	1 2	+ 3
Tukubasan	1·9	306	0 32	− 2	—	—
Onahama	2·0	334	0 34	− 1	0 58	− 4
Yokohama	2·0	280	0 51	?	—	—
Osima	2·2	261	1 3	S	(1 3)	− 3
Utunomiya	2·3	310	0 34	− 6	—	—
Kumagaya	2·4	296	0 42	+ 1	1 13	+ 1
Misima	2·5	270	0 52	+ 9	—	—
Shirakawa	2·5	324	0 38	− 5	1 3	−11
Titibu	2·6	290	1 2	P_g	—	—
Hunatu	2·7	279	0 49a	+ 4	—	—
Maebasi	2·7	299	0 44	− 1	1 17	− 2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Hukusima		2·9	335	0 40	− 8	—	—
Inawashiro		2·9	328	0 44	− 4	—	—
Oiwake		3·1	294	1 6	P_g	—	—
Omaesaki		3·2	261	1 11	P_g	—	—
Sendai		3·3	344	0 44	− 9	1 20	−15
Iida		3·4	278	1 14	P_g	—	—
Isinomaki		3·4	351	0 55	0	—	—
Matusiro		3·4	297	0 56	+ 1	—	—
Matumoto		3·5	291	0 59	+ 2	—	—
Nagano		3·5	298	1 0	+ 3	—	—
Takada		3·6	305	1 30	S	(1 30)	−12
Niigata		3·7	321	2 14	S_g	—	—
Mizusawa	N.	4·1	351	e 1 31	P_g	e 2 19	S_g
Nagoya		4·1	273	1 15	P*	—	—
Toyama		4·2	294	1 37	P_g	—	—
Gihu		4·3	276	1 19	P*	2 7	+7
Kameyama		4·5	269	1 43	P_g	—	—
Miyako		4·5	0	1 42	P_g	—	—
Morioka		4·6	352	1 15	+ 3	—	—
Hikone		4·7	274	1 32	P_g	—	—
Akita		4·9	342	2 5	S	(2 5)	−10
Tsuruga		4·9	278	1 9	− 8	—	—
Osaka		5·3	267	1 59	P_g	3 7	S_g
Kobe		5·6	268	2 28	S	(2 28)	− 5
Aomori		5·8	351	2 3	P_g	—	—
Sumoto		5·9	265	1 52	P_g	—	—
Urakawa		7·1	5	2 52	?	—	—
Koti		7·2	260	2 20	P_g	—	—
Vladivostok		11·2	319	i 2 36	− 8	i 4 45	− 7
Kabansk		30·3	315	e 6 15	0	e 11 9	− 6
Irkutsk		31·8	314	—	—	e 11 38	0

Mizusawa gives also ePE = 1m.35s.
Long waves were recorded at De Bilt, Kew, Pavia, Granada, Strasbourg, and Tamanrasset.

March 4d. Readings also at 1h. (Pierce Ferry, Vera Cruz, near Puebla (2), and Tacubaya (3)), 2h. (Almata II, Krasnogorka, Tchimkent, near Andijan, Fergana, Frunse, Khorog, Stalinabad, and near Triest), 5h. (Apia, College, near Basle, and Zürich), 7h. (College and Hungry Horse), 10h. (Alicante (2) and near Istanbul (2)), 11h. College and Tucson), 12h. (Huancayo, College, New Delhi, Andijan, Fergana, Mary, Samarkand, Tashkent, Tchimkent, near Khorog, Kulyab, and Stalinabad), 13h. (near Istanbul), 14h. (College, near Athens, and Istanbul), 15h. (Vera Cruz, near Puebla, and Tacubaya), 16h. (College), 17h. (Overton, La Paz, and near Huancayo), 18h. (Scoresby Sund, Ottawa, Washington, Pierce Ferry, near Khorog (2), and Stalinabad), 22h. (Erevan, Grozny, Kirovobad, Leninakan, Zugdidi, near Abastumanj, Akhalkalaki, Tsikhlis-Dzhvari, and near Granada).

March 5d. 11h. 14h. 35s. Epicentre 0°·5N. 26°·5W.

$A = +·8949$, $B = -·4462$, $C = +·0087$; $\delta = +2$; $h = +7$;
$D = -·446$, $E = -·895$; $G = +·008$, $H = -·004$, $K = -1·000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Tamanrasset	z.	38·2	52	i 7 27k	+ 4	e 13 22	+ 5	i 8 54 PP	—
La Paz		44·4	246	8 9	− 5	14 41	− 8	i 17 35 SS	—
Algiers Univ.	z.	45·3	34	8 25	+ 4	—	—	— —	—
Huancayo		50·1	254	e 9 4	+ 5	—	—	— —	e 25·3
Paris		54·2	23	i 9 33	+ 4	—	—	— —	e 16·4
Stuttgart		57·1	28	e 9 52	+ 2	—	—	— —	e 35·4
Harvard		58·1	322	i 10 0	+ 2	—	—	— —	—
Pretoria	z.	58·8	120	i 9 39	−23	—	—	— —	—
Collmberg	z.	60·6	28	e 10 18	+ 3	—	—	— —	—
Ottawa	z.	62·2	323	e 10 20	− 6	—	—	— —	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Resolute Bay	z.	83·9	346	e 12 19	−14	—	—	—	—	—
Tucson		84·9	303	e 12 44	+ 6	—	—	—	—	—
Logan		86·3	312	e 13 56	?	—	—	—	—	—
Pierce Ferry		87·7	306	e 12 57	+ 5	—	—	—	—	—
Overton	z.	88·0	307	i 13 0	+ 7	—	—	—	—	—
Hungry Horse		88·0	319	e 12 57	+ 4	—	—	—	—	—
Boulder City		88·4	306	e 13 7	+12	—	—	—	—	—
Palomar	z.	90·0	303	i 13 15	+12	—	—	—	—	—
China Lake	z.	90·6	306	e 13 17	+12	—	—	—	—	—
Mount Wilson	z.	91·0	304	e 13 19	+12	—	—	—	—	—
College		102·4	338	e 23 14	?	—	—	—	—	—

Additional readings :—
Tamanrasset eZ = 7m.34s. and 8m.43s., ePPPZ = 9m.18s., eZ = 9m.59s.
Paris e = 9m.51s.
Resolute Bay eZ = 13m.3s.
Tucson e = 12m.50s.
Overton iZ = 13m.5s.
Long waves were also recorded at Bogota, Granada, and De Bilt.

March 5d. 14h. 46m. 0s. Epicentre 53°·4N. 163°·1W. (as on 1947, Feb. 15d.).

$A = -·5729$, $B = -·1741$, $C = +·8009$; $\delta = -3$; $h = -7$;
$D = -·291$, $E = +·957$; $G = -·766$, $H = -·233$, $K = -·599$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mitchell Field		8·3	265	i 2 3	− 1	i 3 32	− 8	—	—	—
College		13·9	28	e 3 21	0	i 5 55	− 2	—	—	e 7·1
Shasta Dam		30·1	98	i 6 13	0	—	—	i 6 24	pP	—
Hungry Horse		30·9	77	i 6 19	− 1	—	—	i 9 14	PcP	—
Berkeley	z.	32·0	102	e 6 28k	− 2	—	—	e 6 38	pP	—
Reno	z.	32·4	96	e 6 32k	− 2	—	—	—	—	—
Lick	z.	32·7	102	e 6 35k	− 1	—	—	i 6 45	pP	—
Resolute Bay		33·8	25	e 6 49	+ 3	12 26	+16	—	—	—
Fresno		34·2	100	e 6 48k	− 1	—	—	—	—	—
Tinemaha	z.	34·9	99	e 7 40	?	—	—	e 7 50	pP	—
China Lake	z.	36·1	98	i 7 4k	− 1	—	—	i 7 15	pP	—
Mount Wilson	z.	37·0	102	e 7 11	− 2	—	—	e 7 23	pP	—
Overton	z.	37·5	96	i 7 17	0	—	—	i 7 27	pP	—
Boulder City		37·7	97	i 7 18	− 1	—	—	—	—	—
Pierce Ferry		38·0	96	i 7 20	− 1	—	—	i 7 32	pP	—
Palomar	z.	38·3	102	i 7 21k	− 3	—	—	i 7 33	pP	—
Tucson		42·6	98	i 7 59	0	—	—	i 8 10	pP	—
Scoresby Sund	z.	53·3	15	e 9 26	+ 3	—	—	—	—	—
Ottawa	z.	54·0	60	e 9 26	− 2	—	—	—	—	—
Harvard		58·2	59	i 9 57	− 1	—	—	—	—	—
Weston		58·4	59	i 9 59	− 1	—	—	—	—	—
Copenhagen		71·2	3	e 11 24	+ 1	—	—	—	—	—
Collmberg	z.	75·6	3	e 11 50	+ 2	—	—	—	—	—
Paris		77·4	11	i 12 1	+ 3	—	—	i 12 12	pP	—
Stuttgart	z.	78·0	6	e 12 4	+ 2	—	—	—	—	—
Strasbourg		78·1	7	e 12 5	+ 3	—	—	e 12 16	pP	—
Pretoria	z.	151·1	338	i 19 25	[−24]	—	—	—	—	—

Additional readings :—
College i = 3m.32s. and 5m.6s.
Resolute Bay 11m.45s.
Tinemaha eZ = 7m.58s.
China Lake iZ = 7m.23s., iPcPZ = 9m.28s.
Mount Wilson eZ = 7m.30s.
Pierce Ferry isP = 7m.45s.
Palomar iZ = 7m.40s.
Tucson iPcP = 9m.49s.

March 5d. 20h. 11m. 48s. Epicentre 27°·7N. 129°·4E. Depth of focus 0·030.
(as on 1945, June 6d.).

Intensity VI at Nake; V at Minamioagarijima; IV at Miyazaki; II-III at Yakusima and Kumamcto. Epicentre 28°·3N. 129°·3E. Depth of focus 200km.

Seismo. Bull. Cent. Met. Obs., Japan, March 1951. Tokyo, 1951, p.59, with chart of epicentre.

$A = -·5628$, $B = +·6851$, $C = +·4624$; $\delta = -8$; $h = +3$;
$D = +·773$, $E = +·635$; $G = -·294$, $H = +·357$, $K = -·887$.

	△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Yakusima	2·9	19	0 44	− 6	1 16	−13	—	—	—
Miyazaki	4·6	22	1 6k	− 5	1 52	−13	—	—	—
Tomie	4·9	354	1 26	+12	—	—	—	—	—
Nagasaki	5·0	4	1 10k	− 6	2 2	−12	—	—	—
Unzendake	5·1	8	1 13	− 4	2 5	−12	—	—	—
Kumamoto	5·2	12	1 11k	− 7	2 6	−13	—	—	—
Saga	5·6	8	1 18	− 5	2 15	−13	—	—	—
Ooita	5·8	19	1 22	− 4	2 23	− 9	—	—	—
Hukuoka	5·9	9	1 21k	− 6	2 21	−14	—	—	—
Uwazima	6·2	26	1 23	− 8	2 20	−22	—	—	—
Simonoseki	6·3	12	1 25	− 7	2 31	−13	—	—	—
Ituhara	6·4	0	1 24k	− 9	2 31	−15	—	—	—
Koti	6·8	30	1 36	− 2	2 45	−11	—	—	—
Matuyama	6·8	25	1 33	− 5	2 40	−16	—	—	—
Muroto	6·9	35	1 37a	− 3	2 49	− 9	—	—	—
Hamada	7·5	18	1 44a	− 3	3 4	− 8	—	—	—
Takamatu	7·7	30	1 47	− 3	3 7	− 9	—	—	—
Zi-ka-wei	7·8	299	i 1 36	−15	i 3 2	−16	—	—	—
Siomisaki	7·9	42	1 53	0	3 17	− 4	—	—	—
Sumoto	8·1	35	1 53a	− 2	3 18	− 8	—	—	—
Wakayama	8·2	36	1 55a	− 2	3 19	− 9	—	—	—
Matsue	8·3	21	1 42	−16	2 59	−31	—	—	—
Yonago	8·4	23	2 16	+17	—	—	—	—	—
Kobe	8·5	34	1 58	− 2	3 30	− 5	—	—	—
Osaka	8·6	35	2 1	− 1	3 29	− 8	—	—	—
Owase	8·6	41	2 2a	0	3 34	− 3	—	—	—
Kashiwara	8·7	37	2 4	+ 1	3 35	− 4	—	—	—
Toyooka	9·0	29	2 5	− 2	3 40	− 6	—	—	—
Kyoto	9·1	35	2 6	− 2	3 42	− 6	—	—	—
Saigo	9·1	21	2 12	+ 4	—	—	—	—	—
Tu	9·3	39	2 8a	− 3	3 50	− 3	—	—	—
Kameyama	9·4	39	2 12	0	3 53	− 2	—	—	—
Hikone	9·5	36	1 49	−24	3 27	−31	—	—	—
Ibukisan	9·7	36	1 28	?	2 52	?	—	—	—
Tsuruga	9·7	34	2 16a	0	—	—	—	—	—
Gihu	9·9	37	2 18a	0	4 2	− 5	—	—	—
Nagoya	9·9	39	2 19a	+ 1	4 9	+ 2	—	—	—
Torisima	9·9	71	5 33	?	—	—	—	—	—
Hamamatu	10·0	43	2 20	0	4 22	+13	—	—	—
Hukui	10·1	33	2 22	+ 1	4 7	− 5	—	—	—
Nanking	10·2	298	i 2 9	−13	i 3 47	−27	—	—	i 4·0
Omaesaki	10·2	46	2 28a	+ 6	4 21	+ 7	—	—	—
Hatidyozima	10·5	57	2 14	−12	—	—	—	—	—
Iida	10·6	41	2 27	0	4 19	− 4	—	—	—
Kanagawa	10·7	32	2 29	0	4 18	− 7	—	—	—
Takayama	10·7	37	2 32	+ 3	4 30	+ 5	—	—	—
Misima	11·0	45	2 34a	+ 2	4 45	+13	—	—	—
Osima	11·0	48	2 35	+ 3	4 42	+10	—	—	—
Hunatu	11·1	44	2 38a	+ 4	4 47	+12	—	—	—
Kohu	11·1	42	2 44	+10	4 49	+14	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Toyama		11·1	35	2 32	− 2	4 51	+16	—	—	—
Matumoto		11·2	38	2 38	+ 3	4 40	+ 3	—	—	—
Mera		11·4	48	2 38	0	5 5	+23	—	—	—
Matusiro		11·5	38	2 42	+ 3	5 6	+22	—	—	—
Oiwake		11·6	40	2 39	− 1	5 9	+23	—	—	—
Titibu		11·6	42	2 44	+ 4	5 9	+23	—	—	—
Yokohama		11·6	46	2 49	+ 9	5 9	+23	—	—	—
Kumagaya		11·9	43	2 48 a	+ 4	5 13	+20	—	—	—
Maebasi		11·9	41	2 48	+ 4	5 11	+18	—	—	—
Tokyo		11·9	45	2 48 a	+ 4	5 10	+17	—	—	—
Takada		12·0	37	2 48	+ 3	5 16	+21	—	—	—
Utunomiya		12·5	43	2 54 a	+ 3	5 19	+12	—	—	—
Aikawa		12·7	34	2 52	− 2	5 10	− 1	—	—	—
Mito		12·7	44	2 58	+ 4	5 24	+13	—	—	—
Niigata		13·0	36	3 6	+ 8	5 30	+12	—	—	—
Shirakawa		13·1	42	3 3	+ 4	5 30	+10	—	—	—
Inawashiro		13·3	40	3 10	+ 9	5 46	+21	—	—	—
Onahama		13·4	44	3 5	+ 2	5 34	+ 7	—	—	—
Hukusima		13·6	40	3 11	+ 6	5 40	+ 9	—	—	—
Yamagata		13·9	38	3 15	+ 6	—	—	—	—	—
Sendai		14·3	40	3 14	0	5 50	+ 3	—	—	—
Isinomaki		14·6	40	3 19	+ 2	—	—	—	—	—
Akita		14·9	34	3 24 k	+ 3	6 6	+ 6	—	—	—
Mizusawa		15·0	38	3 23	+ 1	6 5	+ 2	6 9	S	—
Manila		15·2	213	i 3 20	− 5	i 6 15	+ 8	i 4 0	sP	—
Morioka		15·4	35	3 27 k	0	6 13	+ 1	—	—	—
Vladivostok		15·5	7	i 3 22	− 6	i 6 7	− 7	—	—	—
Miyako		15·9	38	3 32 k	− 1	6 18	− 5	—	—	—
Aomori		16·1	33	3 37	+ 1	—	—	—	—	—
Sapporo		18·1	28	4 2	+ 4	7 24	+15	—	—	—
Urakawa		18·1	34	4 4	+ 6	7 31	+22	—	—	—
Obihiro		18·9	32	4 14	+ 8	7 24	0	—	—	—
Kusiro		19·5	35	4 12	0	7 33	− 2	—	—	—
Nemuro		20·4	35	4 23	+ 2	7 54	+ 2	—	—	—
Korror		20·8	166	4 45	pP	—	—	—	—	—
Kabansk		29·7	330	i 5 39	− 8	i 12 13	SS	6 16	pP	—
Irkutsk		30·9	330	i 5 50	− 8	12 32	?	6 27	pP	—
Calcutta	E.	37·4	272	e 6 53	0	12 8	−16	i 7 29	pP	—
Chatra		37·4	279	i 6 50	− 3	i 12 19	− 5	7 53	PP	14·9
Djakarta		40·1	216	i 7 26 a	+11	i 13 23	+19	—	—	—
Bombay		40·3	214	i 7 28	+11	i 13 25	+18	—	—	—
Chilisk		43·7	306	i 7 57	pP	e 9 12	PP	i 9 49	PcP	—
Almata II		44·4	306	e 7 46	− 4	—	—	e 9 35	PP	—
Almata		44·7	306	i 7 47	− 5	i 14 8	− 3	i 8 26	pP	—
Dehra Dun	N.	44·7	287	—	—	e 14 6	− 5	—	—	—
Ili		44·7	307	8 14	pP	13 52	−19	10 36	PPP	—
Rybach'e		45·3	304	i 7 51	− 6	—	—	i 8 30	pP	—
Naryn		45·4	303	i 7 53	− 5	17 30	ScS	i 8 31	pP	—
New Delhi		45·7	284	e 7 55	− 5	i 14 15	−11	i 13 37	ScP	—
Krasnogorka		46·0	306	e 7 59	− 4	—	—	i 8 37	pP	—
Frunse		46·4	304	i 8 2	− 4	14 36	+ 1	i 8 40	pP	—
Mitchell Field		46·7	43	i 8 13	+ 5	i 14 51	+11	i 13 50	PcS	i 17·8
Hyderabad		47·9	269	i 8 15	− 2	i 14 55	− 1	10 59	PP	25·0
Andijan		48·1	301	i 8 14	− 5	14 56	− 3	i 8 52	pP	—
Fergana		48·6	301	i 8 18	− 5	16 6	sS	i 8 52	pP	—
Khorog		49·0	297	i 8 23	− 3	i 16 15	sS	i 9 2	pP	—
Tchimkent		50·1	304	i 8 31	− 3	i 18 5	ScS	—	—	—
Kulyab		50·4	298	i 8 31	− 5	i 15 24	− 7	—	—	—
Tashkent		50·4	302	i 8 31?	− 5	i 16 26	sS	i 9 11?	pP	—
Stalinabad		51·1	299	i 8 37	− 5	i 15 33	− 8	9 16	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Poona		51·5	273	i 8 42	− 3	i 15 42	− 4	9 20	pP	22·7
Kodaikanal	E.	51·7	262	i 7 43	−63	i 14 45	−64	8 42	pP	19·4
Bombay	E.	52·3	274	i 8 49	− 1	15 59	+ 2	9 27	pP	—
Samarkand		52·3	299	e 8 44	− 6	—	—	—	—	—
Sverdlovsk		55·8	322	9 11	− 5	16 35	− 9	i 9 51	pP	—
Mary		56·6	300	9 19	− 3	e 18 0	sS	e 9 58	pP	—
Brisbane		59·4	155	i 9 56a	+15	i 18 0	+30	e 10 32	pP	—
College		62·2	29	i 10 2	+ 2	i 18 16	+10	i 10 52	pP	e 27·5
Riverview		64·6	160	i 10 31a	+16	i 19 9	pS	i 11 6	pP	—
Baku		65·1	305	e 10 15	− 4	e 19 55	sS	e 11 1	pP	—
Lenkoran		66·3	303	10 23	− 3	20 3	sS	11 4	pP	—
Grozny		67·2	308	e 10 34	+ 2	i 20 9	ScS	—	—	—
Kirovobad		67·5	306	i 10 32	− 2	i 20 5	ScS	i 11 15	pP	—
Moscow		68·6	323	e 10 36	− 5	20 7	ScS	e 11 17	pP	—
Gori		68·8	307	e 10 40	− 2	e 20 30	sS	—	—	—
Leninakan		69·3	306	e 10 46	+ 1	—	—	e 11 26	pP	—
Abastumanj		69·7	307	e 10 44	− 3	i 20 49	sS	—	—	—
Sitka		70·0	35	i 10 48	− 1	i 19 53	+13	i 11 40	pP	e 28·4
Zugdidi		70·1	309	e 10 54	+ 4	e 20 54	sS	—	—	—
Pulkovo		70·8	329	e 10 51	− 3	20 55	sS	e 11 33	pP	—
Sotchi		71·3	310	e 10 52	− 5	i 21 5	sS	i 11 35	pP	—
Helsinki		73·2	330	i 11 6	− 2	e 20 56	sS	i 11 47	pP	e 28·2
Resolute Bay		73·9	11	e 11 12	0	e 20 27	+ 3	e 13 54	PP	—
Yalta		74·6	313	11 13	− 3	21 34	sS	11 54	pP	—
Upsala		76·5	332	e 11 27a	0	e 20 42	−11	e 21 40	sS	e 34·7
Kishinev		76·9	317	11 26	− 3	22 1	PS	—	—	—
Ksara		77·8	301	i 11 34k	0	14 34	PP	12 15	pP	—
Lwow		78·5	320	i 11 35	− 3	e 21 58?	PS	e 12 14	pP	—
Istanbul		79·5	312	e 11 43	0	e 21 37	+13	e 12 21	pP	—
Scoresby Sund	z.	80·0	351	i 11 47a	+ 1	—	—	i 12 32	pP	—
Uzhgorod		80·0	320	i 11 44	− 2	i 21 35	+ 5	i 12 27	pP	—
Victoria	z.	80·1	40	e 11 54	+ 8	—	—	—	—	—
Wellington		80·5	147	e 20 49	?	i 21 57	+22	—	—	e 30·2
Skalnate Pleso		80·9	321	e 11 52	+ 2	e 21 35	− 4	e 12 46	sP	—
Bergen	z.	81·1	336	e 11 47	− 5	e 13 35	?	—	—	—
Christchurch		81·2	150	—	—	e 34 12?	Q	—	—	—
Copenhagen		81·2	330	i 11 52	0	e 21 42	0	12 34	pP	38·2
Seattle		81·2	40	i 12 3k	+11	13 11	sP	e 12 45	pP	—
Raciborzu		81·5	323	e 11 55	+ 1	e 22 42	sS	e 11 59	PcP	—
Timisoara		82·2	317	e 11 54	− 3	—	—	—	—	—
Sofia		82·4	315	e 11 59	+ 1	—	—	—	—	—
Budapest		82·5	320	12 2	+ 3	e 21 59	+ 4	15 38	PP	40·7
Ogyalla		82·8	321	e 11 59	− 1	e 21 59	+ 1	e 12 34	pP	e 38·7
Potsdam		82·9	327	i 12 3	+ 2	e 22 5	+ 6	e 23 15	PS	e 41·2
Helwan		83·0	300	e 12 2	+ 1	22 0	0	12 38	pP	—
Kalossa		83·0	319	e 11 55	− 6	e 23 1	PS	e 15 32	PP	—
Belgrade		83·1	317	e 11 58k	− 4	e 22 18	+17	e 15 11	PP	e 53·8
Prague		83·5	317	e 12 3k	− 1	e 22 10?	+ 5	e 12 44	pP	—
Collmberg		83·6	325	e 12 3	− 1	e 23 22	PS	e 12 52	pP	e 44·2
Jena		84·5	326	e 12 8	− 1	e 23 22	PS	e 12 52	pP	—
Athens		84·6	310	e 12 8	− 1	—	—	—	—	—
Cheb		84·6	326	e 12 11	+ 2	e 22 15	− 1	e 13 9	sP	—
Shasta Dam		84·9	47	i 12 18	+ 7	—	—	—	—	—
Sonneberg		85·0	325	e 12 11	0	e 23 17	ScS	e 23 33	PPS	—
Ukiah		85·1	48	e 12 22	+10	e 22 40	+20	—	—	e 35·0
Hungry Horse		85·4	37	i 12 21	+ 8	e 22 27	+ 4	i 30 25	PKKP	—
Aberdeen	E.	86·1	336	i 15 47	PP	i 22 31	+ 1	i 23 36	PS	48·8
Berkeley		86·5	49	i 12 28k	+ 9	e 22 51	+17	i 13 10	pP	—
Triest		86·5	321	i 12 16?	− 3	i 22 26	[+ 5]	i 13 4	pP	—
Saskatoon		86·6	31	i 12 34	+15	i 22 48	+13	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
De Bilt		86·8	330	i 12 20k	0	e 22 40	+ 3	i 13 18	pP	e 40·2
Santa Clara		86·9	49	(i 12 33)	+12	i 12 33	P	—	—	—
Stuttgart		87·0	324	i 12 22k	+ 1	e 22 31	− 8	i 13 19	pP	e 45·2
Lick		87·1	49	i 12 31k	+ 9	e 22 59	+19	e 15 51	PP	—
Reno		87·2	46	e 12 31k	+ 9	e 22 38	− 2	e 13 8	pP	—
Karlsruhe		87·3	326	e 12 24	+ 1	e 23 49	PS	—	—	e 45·2
Taranto		87·5	315	e 13 2	pP	e 22 52	+ 9	15 52	PP	—
Butte		87·6	37	i 12 33	+ 9	i 23 0	+16	i 24 10	PS	e 37·1
Durham		87·7	334	i 16 41	PP	i 22 34	[+ 5]	—	—	—
Padova		87·7	321	12 27	+ 3	22 37	[+ 8]	16 5	PP	—
Strasbourg		87·9	326	e 12 26k	+ 1	e 22 52	+ 5	e 13 7	pP	—
Chur		88·1	324	e 12 26k	0	e 22 25	[− 6]	—	—	e 44·5
Zürich		88·3	325	e 12 26k	− 1	e 22 46	− 5	e 13 18	pP	—
Salo		88·4	322	e 12 29a	+ 1	e 23 6	+14	e 13 16	pP	—
Bologna		88·6	321	e 12 32	+ 3	e 23 4	+10	e 23 58	PS	—
Basle		88·7	325	e 12 29k	0	—	—	e 14 6	pP	e 49·2
Bozeman		88·7	37	e 12 39	+10	i 23 9	+15	e 13 14	pP	e 35·8
Fresno		88·7	48	e 12 38k	+ 9	e 22 52	− 2	e 16 2	PP	—
Prato		89·1	320	i 12 33	+ 2	e 23 4	+ 6	—	—	—
Pavia		89·4	322	e 12 34k	+ 2	e 22 32	[− 7]	i 23 59	PS	e 42·1
Rome		89·5	318	i 12 32	− 1	e 23 8	+ 6	i 13 19	pP	e 40·2
Tinemaha		89·5	48	i 12 44k	+11	e 23 22	+20	i 13 27	pP	—
Kew		89·6	332	i 12 34k	+ 1	e 22 46	[+ 5]	e 13 18	pP	e 43·2
Besançon		89·7	325	e 12 35	+ 1	e 16 42	PP	e 13 47	sP	—
Messina	z.	89·9	313	e 12 36	+ 1	—	—	e 18 3	PPP	—
Paris		90·2	328	i 12 37	+ 1	i 23 14	+ 6	i 13 20	pP	e 35·2
Rathfarnham Castle		90·6	336	i 12 41	+ 3	e 24 4	PS	i 13 33	pP	e 44·7
China Lake		90·7	48	i 12 48k	+10	i 23 33	+21	i 16 25	PP	—
Pasadena		91·3	50	i 12 50k	+ 9	i 23 34	+16	i 13 37	pP	e 38·0
Salt Lake City		91·3	41	e 12 48	+ 7	e 23 33	+15	e 13 48	sP	e 37·3
Ivigtut		91·4	359	e 12 46	+ 4	24 7	pS	i 25 43	PPS	—
Tananarive		91·7	250	e 19 32	?	e 23 32	+11	24 41	PS	48·4
Riverside	z.	91·9	50	i 12 52	+ 8	—	—	—	—	—
Clermont-Ferrand		92·2	326	e 12 16	?	e 23 44	+18	e 13 15	pP	—
Overton	z.	92·3	47	i 12 55	+ 9	e 23 43	+17	—	—	—
Boulder City		92·4	46	e 12 55	+ 9	e 23 44	+17	i 13 44	pP	—
Palomar		92·6	50	i 12 55k	+ 8	i 23 45	+16	i 16 39	PP	—
Pierce Ferry		92·9	46	e 12 56	+ 7	e 23 37	+ 5	i 13 40	pP	—
Tucson		97·3	47	e 13 17	+ 8	e 23 44	SKKS	i 14 11	pP	e 41·3
Algiers Univ.	z.	98·4	319	e 13 13	− 1	—	—	—	—	—
Alicante		99·3	322	e 13 24	+ 6	e 24 24	− 2	17 10	PP	e 45·7
Toledo		100·0	325	e 13 23	+ 2	e 27 16	PPS	e 17 25	PP	—
Almeria		101·4	322	e 13 42	+15	i 25 8	+25	e 17 46	PP	55·5
Granada		101·8	324	14 15	pP	23 46	[+ 1]	18 27	PP	49·7
Malaga		102·6	324	i 13 32	0	24 12?	[+24]	17 14	PP	58·8
Chicago		102·8	27	e 17 46	PP	e 24 57	+ 2	e 27 49	PPS	—
Ottawa		103·4	17	e 13 42	+ 6	e 24 5	[+13]	e 18 0	PP	e 40·2
Seven Falls	E.	103·4	14	—	—	e 25 6	+ 6	—	—	41·6
St. Louis		104·3	31	i 13 43	+ 2	e 24 6	[+10]	i 17 22	PKP	—
Cleveland		105·4	23	e 13 51a	P	e 24 12	[+10]	e 27 27	PS	—
Tamanrasset	z.	106·2	307	e 13 44	P	e 18 5	PP	e 29 35	PKKP	—
Harvard		107·5	15	e 14 0	P	e 25 33	S	i 18 28	PP	e 47·7
Morgantown		107·6	23	i 17 22	PKP	—	—	i 19 28	PP	—
Weston		107·7	15	e 14 1	P	e 33 27	SS	e 18 28	PP	—
Palisades		108·3	18	e 18 26	PP	i 24 27	[+13]	i 25 41	S	—
Pretoria	z.	110·8	251	i 17 44	[−21]	—	—	—	—	—
Columbia		112·2	27	e 22 56	pPKS	e 29 26	PPS	—	—	e 52·2
San Juan		131·8	19	i 18 55	[+ 8]	—	—	e 22 4	PKS	—
Chinchina		139·5	40	i 19 7	[+ 6]	i 22 7	PKS	i 35 26	PPS	e 64·2
Bogota		140·7	38	i 19 10	[+ 7]	i 40 33	SS	i 22 50	PP	—
Huancayo		152·1	61	i 19 35	[+13]	e 33 10	SKSP	e 20 10	pPKP	e 62·2
La Paz		160·3	57	i 19 44k	[+12]	30 54	SKKS	1 24 17	PP	77·2
La Plata		170·5	—	29 0	PPP	—	—	—	—	45·7

For Notes see next page.

NOTES TO MARCH 5d. 20h. 11m. 48s.

Additional readings :—
Zi-ka-wei i = 1m.42s., e = 2m.46s.
Nanking i = 2m.26s., 2m.44s., and 3m.23s.
Manila iSS = 7m.34s.
Kabansk PcP = 8m.26s., iScS = 15m.36s.
Calcutta sPE = 7m.46s., PPE = 8m.5s., PPPE = 8m.20s., PcPE = 9m.7s., ipPcP?E = 9m.50s., iE = 11m.23s., sSE = 13m.3s., SSE = 13m.13s., SSSE = 13m.50s.
Chatra PPPN = 8m.15s., PcPN = 9m.45s., iZ = 11m.55s., PcSN = 13m.19s., SSSN = 14m.5s., ScS = 16m.49s.
Naryn SSS = 18m.42s.
New Delhi PPSN = 14m.39s., isSN = 15m.19s., iSSN = 17m.34s., SSSN = 18m.13s.
Frunse isS = 15m.40s.
Hyderabad iSEN = 15m.57s., SSE = 19m.35s.
Andijan isS = 15m.58s.
Fergana ePcP = 9m.48s.
Stalinabad sS = 16m.35s.
Poona PcPE = 9m.59s., PPE = 10m.33s., PPPE = 11m.23s., PSE = 15m.49s., PPSE = 15m.57s. and 16m.16s., SSE = 16m.44s., ScSE = 18m.12s., SSE = 18m.59s., QE = 20m.24s., SSSE = 20m.29s.
Kodaikanal PPPE = 10m.27s., sSE = 15m.55s., SSE = 18m.20s., SSSE = 19m.57s.
Bombay PcPE = 10m.14s., PPE = 10m.50s., PPPE = 11m.46s., sSE = 16m.55s., ScSE = 18m.44s., SSE = 19m.32s., SSSE = 20m.52s.
Sverdlovsk isS = 17m.44s.
Brisbane iEN = 19m.38s.
College ePP = 12m.30s., iScS = 19m.30s., eSS = 22m.20s., ePKP,PKP? = 39m.10s.
Riverview iZ = 11m.22s., iN = 19m.51s., isSN = 20m.16s.
Moscow PPP = 14m.47s., sS = 20m.29s.
Sitka iPP = 13m.24s., i = 14m.38s., iPPP = 15m.32s., isS = 20m.22s., i = 23m.42s., iSS = 25m.0s., eSSS = 27m.28s.
Pulkovo ePPP = 15m.9s., eScS = 20m.32s.
Helsinki iZ = 11m.25s., isPZ = 11m.57s., iE = 15m.32s., eZ = 15m.38s., iE = 21m.9s.
Resolute Bay ePZ = 11m.36s., eNZ = 11m.54s., eN = 21m.5s., 21m.18s., 21m.32s., 25m.15s., 28m.58s., and 30m.54s.
Upsala eE = 16m.44s., eN = 16m.56s. and 17m.39s., esPS = 22m.30s., and other unidentified readings.
Istanbul ePP?E = 15m.20s., eE = 16m.45s., eZ = 22m.7s., esSE = 22m.52s., eSSE = 27m.22s.
Uzhgorod ipS = 16m.34s.
Skalnate Pleso e = 13m.31s., ePPE = 15m.12s., eN = 15m.36s., esS = 22m.36s., ePS = 22m.53s., eSS = 27m.0s., e = 29m.12s., eSSS? = 31m.30s.
Copenhagen 15m.0s., 15m.42s., 23m.6s., 27m.42s., and 32m.18s.
Seattle iPcP = 12m.13s., i = 12m.25s. and 14m.7s.
Raciborzu eZ = 12m.41s., ePPZ = 15m.2s.?, ePPPZ = 16m.46s., eEN = 23m.13s.
Budapest PN = 12m.6s., eN = 13m.57s., PPPE = 17m.39s., ePPPN = 17m.42s., SKKSN = 22m.51s., SE = 23m.10s., SN = 23m.14s., PPSN = 25m.28s., eSSSE = 33m.12s.?, eSSSN = 33m.42s.
Ogyalla esPE = 12m.59s., esPN = 13m.2s., epPPE = 15m.55s., ePS = 23m.0s., esPS = 23m.52s. and other unidentified e readings.
Helwan PPPE = 15m.12s., eN = 15m.54s., 23m.12s., and 28m.42s.
Kalossa eE = 12m.48s., eN = 13m.32s. and 14m.55s.
Belgrade eZ = 12m.2s. and 12m.47s., eNE = 16m.7s., 19m.33s., and 25m.48s.
Prague esP = 13m.6s., eSKS? = 22m.20s., epS = 23m.1s., esS = 23m.20s., eSS = 27m.36s., esSS = 28m.32s., eSSS = 31m.12s. and other unidentified e readings.
Collmberg ePP?Z = 15m.53s., eE = 35m.12s.
Jena epP?N = 12m.55s., eN = 14m.52s., ePPN = 15m.18s., eZ = 15m.56s., eS?N = 23m.26s., ePS?E = 23m.58s., ePS?N = 24m.1s. and 24m.4s.
Cheb e = 12m.33s., 13m.19s., 14m.6s., 14m.45s., 14m.56s., and 21m.23s., esS = 23m.27s., e = 23m.54s., eSS? = 27m.29s.
Sonneberg eN = 14m.51s.
Hungry Horse i = 12m.40s., eS = 22m.39s., eSKP,PKP? = 41m.26s., e = 44m.30s.
Aberdeen SE = 22m.53s., eE = 29m.27s., iE = 40m.58s.
Berkeley eE = 12m.41s., esPZ = 13m.34s., ePPZ = 15m.46s., eZ = 23m.44s., esS?N = 23m.56s., eE = 24m.32s., eN = 35m.36s.
Triest ePP = 15m.43s., iPS = 23m.36s., iSPPZ = 24m.36s., eSS? = 29m.40s.
De Bilt iPP = 15m.42s.?, ipPP = 16m.35s., ePS = 23m.37s., esS = 24m.35s.
Stuttgart e = 13m.3s., esP? = 13m.52s., ePP = 15m.43s., epPP? = 16m.22s., esPPP? = 20m.12s., eS? = 23m.29s., ePS = 23m.55s., ePPS = 24m.37s., ePKKP? = 30m.24s., e = 36m.12s.
Reno ePPZ = 15m.55s., eE = 22m.44s.
Taranto SS? = 28m.42s.
Butte eSS = 28m.44s.
Durham iN = 20m.17s.
Strasbourg esP = 13m.21s. and 13m.27s., ePP = 15m.42s., epPP = 16m.32s., eSKS = 22m.32s., esSKS = 23m.48s., iPS = 24m.6s., ePPS? = 24m.35s. and 24m.55s., eSS = 28m.48s. also other unidentified e readings.
Zürich eS = 23m.20s.
Salo e = 12m.32s., eSKSEN = 22m.44s., eN = 23m.54s.

Continued on next page.

Bozeman ePS =24m.19s., eSS =28m.55s.
Fresno eE =12m.52s., eZ =14m.50s. and 19m.38s., eE =23m.10s.
Pavia eZ =13m.53s., e =16m.56s., 21m.14s., and 25m.17s.
Rome iPP =15m.58s., eSKS =22m.40s., ePS =24m.13s., SS =29m.34s.
Tinemaha eSKSEN =22m.58s.
Kew iPP =16m.5s., ipPP =16m.44s., eS =23m.50s., ePS =25m.14s., eSS =30m.10s., eSSSEN =34m.58s.
Besançon e =12m.47s. and 15m.25s.
Paris isP =13m.35s., iPP =16m.10s., ipPP =16m.50s., i =17m.10s., ePPP =18m.10s., i =20m.30s., iSKS =22m.52s., iSKKS =23m.2s., i =24m.0s., 24m.7s., and 24m.10s., iSP =24m.25s., iSS =29m.2s., iSSP =29m.35s., i =30m.10s., iSSS =33m.0s.
Rathfarnham Castle e =17m.11s., eZ =21m.18s., eEN =25m.50s. and 26m.53s., eSSEN =30m.19s., eSSS =34m.42s.
China Lake iZ =13m.21s. and 13m.30s., eZ =14m.15s., iSKSE =23m.6s., eN =24m.20s.
Pasadena ePP?Z =15m.59s., iPPZ =16m.27s., eSKSEN =23m.8s., iSP =24m.38s., eSSEN =29m.2s., eQEN =36·8m. and other unidentified readings.
Salt Lake City eS =24m.36s., eSS =29m.32s., eSSS =33m.24s.
Tananarive SS =29m.30s.
Clermont-Ferrand e =15m.52s., ePP =16m.31s., ipPP? =16m.54s., eSKS? =22m.33s., eSP =24m.30s., ePPS =25m.54s., eSS =29m.30s.
Boulder City eSKS =23m.15s.
Palomar iZ =13m.58s., iSKSEN =23m.17s.
Pierce Ferry iPP =16m.40s., eSKS =23m.18s.
Tucson ePP =17m.8s., ePS =25m.40s., ePPS =26m.56s.
Alicante PS =26m.11s., PPS =26m.58s., SS =30m.36s., SSS =34m.28s., Q =40m.4s.
Toledo e =18m.4s., eE =22m.1s.
Almeria PPP =20m.0s., SS =32m.28s.
Granada PPP =21m.6s., S =25m.30s., iSS =33m.9s., SSS =37m.36s.
Malaga PPP =19m.18s.
Chicago eSSS =36m.40s.
Ottawa e =25m.15s., 27m.8s., and 28m.3s.
St. Louis e =15m.44s., iPP? =18m.3s., i =18m.20s., epPP =18m.45s., iS =25m.21s., ePPS =27m.58s., iSS =32m.43s., e =33m.39s. and 36m.43s.
Cleveland eSKKSN =24m.49s., esSKSN =25m.23s., isSKSE =25m.26s., esSKKSN =eE =26m.40s., and 28m.0s., eN =28m.14s.
Tamanrasset eZ =16m.9s., 16m.55s., and 17m.15s., ipPPZ =18m.50s., ePPPZ =20m.32s., eZ =22m.13s., eZ =29m.54s., ePKP,PKP?Z =37m.35s.
Harvard isPP =19m.16s., ePPP =20m.54s., ePS =27m.48s., esPS =28m.41s., i =29m.29s., esSS =34m.27s.
Palisades e =19m.25s., ePS =27m.48s.
Chinchina iSSEN =40m.22s.
Huancayo i =19m.42s., ePP =23m.24s., eSPP =36m.33s., eSS =42m.43s., eSSS =48m.51s., e =56m.29s.
La Paz iPKP$_2$Z =20m.26s., i =28m.46s., SS =44m.52s., i =45m.30s., SSS =50m.38s.
La Plata EN =31m.36s., N =32m.30s., E =32m.42s.

March 5d. 22h. Undetermined Local Shock.

Overton iPZ =54m.41s.
Boulder City iP? =54m.48s., iS =55m.12s.
China Lake iPEZ =55m.18s., iEZ =55m.24s., iSEZ =56m.14s.
Haiwee ePZ =55m.21s.
Tinemaha ePZ =55m.23s., eSN =56m.22s.
Riverside ePZ =55m.28s., iZ =55m.38s., iS =56m.44s.
Palomar iPZ =55m.30s.$_a$, i =56m.26s., iSEN =56m.45s.
Tucson eP =55m.34s., i =55m.45s., eS? =56m.18s., eL =56m.39s.
Pasadena ePZ =55m.37s., iZ =55m.47s., eSEZ =56m.56s.
Hungry Horse eP =57m.16s.

March 5d. Readings also at 0h. (Mizusawa, Merida, Puebla, Vera Cruz, China Lake, Tucson, Boulder City, Overton, Pierce Ferry, Lick, Hungry Horse, Morgantown, Ottawa, and Weston), 1h. (Chatra, Paris, Stuttgart, Boulder City, Overton, Pierce Ferry, College, and near Ili), 2h. (Hungry Horse), 3h. (Grahamstown, and near Khorog), 4h. (Pierce Ferry, Stuttgart, near Chur, and near Khorog), 5h. (near Athens), 8h. (Akhalkalaki, Gandzha, Grozny, Shemakla, near Kirovobad, Leninakan, and Tsikhlis-Dzhvari), 10h. (near Apia, and near Huancayo), 11h. (Mount Wilson, China Lake, Tucson, Pierce Ferry, College, and Collmberg), 12h. (near Victoria, and near Vladivostok), 13h. (Apia and near Seattle), 15h. (Zi-ka-wei), 17h. (near Stalinabad), 18h. (Christchurch, Wellington, Brisbane (2), Hungry Horse (2), College (2), Resolute Bay, Abastumanj, Gori, Grozny, Tiflis, near Akhalkalaki, Gandzha, Kirovobad, and Tsikhlis-Dzhvari), 20h. (Fort de France, Chatra, Khorog, near Kulyab, and Stalinabad), 21h. (Apia and College), 22h. (Andijan, Ashkabad, Fergana, Khorog, Kulyab, Rybach'e, Samarkand, Tashkent, Tchimkent, near Mary, and near Victoria), 23h. (Overton).

March 6d. Local shocks at 3h. and 5h. in Roumania. Data insufficient for determination.

3h.

Taranto P =15m.47s., S =16m.24s., S_g =16m.36s.
Belgrade ePZ =16m.2s., eP*Z =16m.10s., eZ =16m.27s. and 16m.33s., iS =16m.52s., iS_gZ =17m.7s.
Sofia ePN =16m.3s., eN =16m.37s., eSN =16m.55s.
Messina eZ =16m.23s. and 16m.49s., iZ =17m.29s. and 18m.0s.
Timisoara eN =16m.28s.? and 16m.58s., eE =17m.6s.
Istanbul ePZ =17m.
Triest eP_g? =17m.26s., eS? =18m.12s., eS_g? =18m.20s., eQ? =18m.31s.
Stuttgart ePZ =17m.39s.?, eZ =17m.55s., 19m.19s., and 20m.50s.
Kalossa eE =17m.41s.
Zürich e =18m.29s.
Jena eN =19m.4s.?, eE =19m.44s., eN =20m.6s., eE =20m.33s., and 20m.48s.
Prague e =19m.32s. and 20m.4s.
Collmberg eZ =19m.34s. and 21m.14s.
Hungry Horse eP =27m.27s.

5h.

Taranto P =14m.30s., S =14m.52s., S_g =15m.2s.
Belgrade ePZ =14m.43s. a, eP_gZ =14m.56s., eZ =15m.6s., eSZ =15m.33s., i =15m.38s., iP_gS_gZ =15m.41s., eS_gNW =15m.51s.
Sofia ePE =14m.47s., eE =15m.17s., eSE =15m.47s.
Messina eZ =15m.14s., iZ =16m.28s.
Istanbul ePZ =15m.43s., eZ =16m.17s., and 18m.1s.
Timisoara eEN =15m.48s.
Triest eP? =16m.15s., eP_g? =16m.23s., eS_g =16m.57s.,
Stuttgart ePZ =16m.16s.?, eSZ =18m.16s., eZ =19m.34s.
Kalossa eE =16m.27s., eN =16m.31s., eE =17m.16s.
Zürich e =17m.33s.
Jena eE =18m.11s.?, eN =18m.15s. and 18m.35s., eE =19m.8s., and 19m.35s., eN = 19m.39s., eE =19m.42s.
Prague eE =18m.28s. and 18m.40s., eS? =19m.0s., e =19m.11s.
Hungry Horse eP? =26m.10s.

March 6d. 8h. 45m. 45s. Epicentre 25°·5S. 67°·0W. (as on 1950, June 17d.).
Intensity III between S. Latitudes 27° and 28° in Chile.

F. Greve.
Boletin del año 1951. Instituto sismologico, Universidad de Chile, Santiago, p.9.

A = +·3531, B = −·8319, C = −·4281 ; δ = +1 ; h = +3 ;
D = −·921, E = −·391 ; G = −·167, H = +·394, K = −·904.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
La Paz		9·0	353	2 15	+ 2	i 3 39	−19	4·2
Harvard		67·8	357	i 11 0	− 2	—	—	—
Ottawa	z.	71·0	353	e 11 19	− 3	—	—	—
Tucson		71·0	322	i 11 24	+ 2	—	—	—
Palomar	z.	75·3	319	i 11 46k	− 1	—	—	—
Pierce Ferry		75·7	322	i 11 47	− 2	—	—	—
Boulder City		76·0	321	i 11 49	− 2	—	—	—
Riverside	z.	76·1	318	i 11 50k	− 1	—	—	—
Overton	z.	76·2	322	i 11 51	− 1	—	—	—
Pasadena	z.	76·7	318	i 11 53k	− 2	—	—	—
China Lake	z.	77·5	320	i 11 58k	− 1	—	—	—
Tinemaha	z.	78·7	320	i 12 6k	0	—	—	—
Lick	z.	80·9	319	i 12 17k	0	—	—	—
Hungry Horse		84·7	331	i 12 36	− 1	—	—	—
Tamanrasset	z.	85·1	62	e 12 48	+ 9	—	—	—

Additional readings :—
Harvard i =11m.31s., e =11m.47s,
Ottawa eZ =11m.51s.
Lick eZ =13m.1s,

March 6d. 18h. 58m. 13s. Epicentre 28°·7N. 95°·4E.

Intensity V at Srinagar, Tezpur, Gauhati ; IV at Dibrugarh.
Poona suggests epicentre 29°·3N. 94°·8E.

Seismo. Bull., Government of India Met. Dept., March, 1951, p.17.

$A = -\cdot0827$, $B = +\cdot8746$, $C = +\cdot4777$; $\delta = -4$; $h = +2$;
$D = +\cdot996$, $E = +\cdot094$: $G = -\cdot045$, $H = +\cdot476$, $K = -\cdot879$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		7·5	258	e 1 55	+ 2	i 3 25	+ 5	2 2	PP	3·2
Calcutta	N.	8·8	228	e 2 14	+ 3	i 3 49	− 4	i 4 1	SS	—
New Delhi		16·0	274	e 3 41	− 7	i 6 34	−12	3 53	PP	7·1
Hyderabad		19·2	238	i 4 25	− 3	i 8 3	+ 4	—	—	10·0
Chilisk		20·2	323	e 4 38	− 1	—	—	—	—	—
Naryn		20·3	314	i 4 41	+ 1	i 8 27	+ 4	—	—	—
Nanking		20·5	74	i 4 40	− 2	i 8 29	+ 2	i 4 58	PP	9·4
Almata II		20·6	321	i 4 43	0	—	—	—	—	—
Almata		20·8	321	i 4 44	− 1	i 8 38	+ 5	—	—	—
Rybach'e		20·8	319	i 4 45	0	—	—	—	—	—
Ili		21·1	323	i 4 46	− 2	8 43	+ 4	—	—	—
Khorog		21·8	299	i 4 56	0	i 8 56	+ 4	—	—	—
Krasnogorka		21·8	317	e 4 56	0	—	—	—	—	—
Frunse		22·0	316	e 4 57?	− 1	i 9 1?	+ 5	—	—	—
Poona		22·2	247	i 4 58	− 2	8 59	− 1	5 2	pP	10·4
Andijan		22·4	308	5 2	0	i 9 5	+ 1	—	—	—
Fergana		22·6	308	e 5 4	+ 1	e 9 10	+ 3	—	—	—
Zi-ka-wei	Z.	22·7	76	5 3	− 1	e 9 8	− 1	—	—	11·2
Bombay		22·8	250	5 8	+ 3	i 9 10	− 1	6 6	PPP	10·9
Kulyab		23·2	300	e 5 11	+ 2	i 9 21	+ 3	—	—	—
Stalinabad		24·2	302	i 5 18	− 1	i 9 36	+ 1	—	—	—
Irkutsk		24·5	12	i 5 24?	+ 2	—	—	—	—	—
Semipalatinsk		24·6	337	e 5 23	0	—	—	—	—	—
Tashkent		24·7	308	i 5 24	0	e 9 45	+ 1	—	—	—
Kodaikanal	E.	24·9	227	i 5 27	+ 1	i 9 52	+ 5	—	—	11·9
Tchimkent		24·9	310	i 5 26	0	—	—	—	—	—
Samarkand		25·8	303	e 5 37	+ 3	—	—	—	—	—
Colombo	E.	26·2	218	5 37	− 1	10 12	+ 3	—	—	16·0
Manila		27·6	114	e 4 47?	?	—	—	—	—	—
Vladivostok		32·6	53	i 6 34	− 1	i 11 39	−12	—	—	—
Sverdlovsk		37·3	329	i 7 16	0	13 2	− 2	—	—	—
Lenkoran		39·7	298	7 37	+ 1	13 37	− 3	—	—	—
Mcscow		48·8	321	e 8 49	0	e 15 49	− 3	—	—	—
Ksara		50·5	292	i 9 3	+ 1	i 16 27	+11	i 9 36	?	—
Pulkovo		53·2	325	e 9 21	− 1	e 16 50	− 2	—	—	—
Istanbul		54·6	302	e 9 32	0	—	—	—	—	e 26·9
Helwan		55·2	288	e 17 19	S	(e 17 19)	− 1	—	—	—
Raciborzu	Z.	60·6	314	10 13	− 2	—	—	—	—	—
Copenhagen		63·0	322	i 10 29	− 2	—	—	—	—	30·8
Prague		63·0	315	e 10 31	0	e 19 2	+ 1	e 12 49	PP	—
Collmberg	Z.	63·6	316	e 10 33	− 2	—	—	e 11 15	PcP	—
Jena		64·6	316	e 10 41	0	—	—	e 10 45	PcP	—
Stuttgart		66·6	314	e 10 53	− 1	—	—	—	—	e 36·8
Karlsruhe	Z.	67·1	315	e 10 58	+ 1	—	—	e 11 4	P	—
Zürich		67·5	313	i 10 59a	− 1	—	—	i 11 3	P	—
Strasbourg		67·6	314	i 11 0	− 1	—	—	e 11 6	PcP	e 36·8
Basle		68·0	313	e 11 8a	+ 5	—	—	—	—	—
Besançon		69·2	313	e 11 9	− 1	—	—	e 11 58	PcP	—
Paris		70·8	316	i 11 20	0	—	—	—	—	e 43·3
Clermont-Ferrand		71·5	312	11 0?	−24	—	—	—	—	—
Rathfarnham Castle		74·0	323	e 11 44?	+ 5	e 20 29	−42	—	—	e 36·8
College		74·8	23	e 11 43	− 1	e 21 20	0	—	—	e 37·2
Resolute Bay	Z.	76·7	3	e 11 53	− 2	—	—	e 15 2	PP	—
Brisbane	Z.	78·6	129	i 12 6a	+ 1	—	—	—	—	—
Tamanrasset	Z.	79·3	290	e 12 8	− 1	—	—	e 15 7	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pretoria	z.	84·2	237	i 12 37	+ 3	—	—	—	—	—
Pietermaritzburg	z.	84·9	232	i 12 39	+ 1	—	—	—	—	—
Hungry Horse		98·9	19	e 13 44	+ 1	—	—	e 17 36	PP	—
China Lake	z.	108·7	28	e 18 59	PP	—	—	—	—	—
Overton	z.	109·3	25	e 19 2	PP	—	—	—	—	—
Pierce Ferry		109·8	24	e 19 7	PP	—	—	—	—	—
Chinchina		145·4	344	i 19 41	[+ 1]	—	—	—	—	—
La Paz	z.	160·6	305	e 20 10	[+ 9]	—	—	e 24 30	PP	—
Huancayo		161·3	331	e 20 7	[+ 5]	—	—	—	—	—

Additional readings :—
Chatra PPPE =2m.8s., P*E =2m.13s., PgEN =2m.29s., SSE =3m.38s., SSSE =3m.48s., S*E =4m.55s.
New Delhi PPPEN =4m.1s., SSEN =6m.50s., SSSN =7m.3s.
Nanking ePPP =5m.5s., iSS? =9m.1s.
Poona PPE =5m.23s., PPPE =5m.35s., PcPE =8m.41s., sS?E =9m.9s., SSE =9m.42s., SSSE =9m.57s.
Bombay iSN =9m.14s.
Copenhagen 10m.35s.
Prague e =11m.2s., 11m.21s.?, 11m.53s., and 13m.10s.
Jena eEN =11m.44s., eN =12m.7s., eE =12m.13s., ePP?N =12m.59s.
Stuttgart eZ =10m.59s.
Strasbourg e =11m.42s. and 13m.27s.
Besançon e =11m.14s.
Paris i =11m.25s.
College i =12m.43s.
Tamanrasset eZ =13m.5s., ePPP?Z =17m.5s., eZ =18m.0s.
Long waves were also recorded at De Bilt, Kew, and Upsala.

March 6d. 23h. 21m. 57s. Epicentre 38°·4S. 178°·8E. (as on 1947, June 16d.).

A = −·7855, B = +·0165, C = −·6186 ; δ = −5 ; h = −1 ;
D = +·021, E = +1·000 ; G = +·618, H = −·013, K = −·786.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Tuai	N.	1·3	253	—	—	e 0 58	?
Auckland	N.	3·5	294	e 0 53	− 4	i 1 33	− 7
New Plymouth	E.	3·8	257	e 1 3	+ 2	i 1 49	+ 2
Wellington		4·2	226	e 1 8	+ 1	i 1 59	+ 2
Cobb River	E.	5·4	238	e 1 9	−15	e 1 56	−32
Christchurch		6·9	220	—	—	e 3 4	− 1
Kaimata	N.E.	6·9	231	e 1 57	+12	e 3 2	− 3

March 6d. Readings also at 0h. (Collmberg), 1h. (Tacubaya, Mount Wilson, Palomar, Riverside, China Lake, Tucson, Overton, Tamanrasset, and near Chilisk), 2h. (Pierce Ferry), 3h. (Grahamstown (2), Pretoria, and Tananarive), 4h. (Tacubaya), 5h. (near Athens), 7h. (College), 8h. (Overton (2), Pierce Ferry (2), College, Andijan, Fergana, Stalinabad, near Khorog, and Kulyab), 9h. (Oaxaca, Puebla, Tacubaya, Vera Cruz, Mount Wilson, Palomar, Tucson, Hungry Horse, College, near Akhalkalaki (2), and Gandzha (2)), 11h. (Apia, near Akhalkalaki (2), Gandzha (2), and near Istanbul), 12h. (Chatra, Prague, and near Apia), 15h. (Hungry Horse and College), 17h. (Klyuchi), 22h. (Hungry Horse, near Tacubaya, and near Chilisk), 23h. (Granada).

March 7d. 6h. 20m. 32s. Epicentre 25°·5S. 67°·0W. (as on 6d.).

Intensity III between S. latitudes 27° and 28° in Chile.

F. Greve.
Boletin del año 1951. Instituto sismologico Universidad de Chile, Santiago, p.9.

		△	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
La Paz		9·0	353	2 17	+ 4	i 3 35	−23	4·5
Huancayo		15·5	328	e 3 46	+ 4	—	—	—
Tucson		71·0	322	e 11 19	− 3	—	—	—
Palomar	z.	75·3	319	i 11 40	− 7	—	—	—
Pierce Ferry		75·7	322	i 7 59	?	—	—	—
Riverside	z.	76·1	318	i 11 49	− 2	—	—	—
Pasadena	z.	76·7	318	e 11 52	− 3	—	—	—
China Lake	z.	77·5	320	i 11 56	− 3	—	—	—
Tinemaha	z.	78·7	320	e 12 5	− 1	—	—	—
Hungry Horse		84·7	331	i 7 37	?	—	—	—
Tamanrasset	z.	85·1	62	i 12 38k	− 1	—	—	—
College		109·0	333	e 5 41	?	—	—	—

Tucson gives also e = 11m.39s. and 12m.0s.

March 7d. 18h. 31m. 56s. Epicentre 35°·5N. 142°·1E.

Intensity II-III at Utunomiya. Epicentre as adopted. Depth 30km.

Seismo. Bull. Cent. Met. Obs., Japan. Tokyo, 1951, p.61, with macroseismic chart.

A = −·6439, B = +·5013, C = +·5781 ; δ = +11 ; h = 0 ;
D = +·614, E = +·789 ; G = −·456, H = +·355, K = −·816.

	△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Tyosi	1·0	283	0 45	?	1 11	?	—	—
Mito	1·6	304	0 29a	− 1	0 49	− 2	—	—
Onahama	1·7	326	0 28a	− 3	0 50	− 4	—	—
Tukubasan	1·8	294	0 34	+ 2	—	—	—	—
Tokyo	1·9	275	0 37k	+ 3	1 1	+ 2	—	—
Mera	2·0	250	0 2	?	—	—	—	—
Yokohama	2·0	268	0 50	+15	1 26	+24	—	—
Utunomiya	2·1	300	0 33a	− 4	—	—	—	—
Shirakawa	2·2	317	0 36	− 2	—	—	—	—
Kumagaya	2·3	287	0 42	+ 2	1 12	+ 3	—	—
Osima	2·3	252	0 39	− 1	—	—	—	—
Titibu	2·5	281	0 43	0	—	—	—	—
Inawashiro	2·6	322	0 48	+ 4	1 15	− 2	—	—
Hukusima	2·6	330	0 43	− 1	1 15	− 2	—	—
Maebasi	2·6	290	0 45	+ 1	1 14	− 3	—	—
Misima	2·6	262	0 42	− 2	1 7	−10	—	—
Hunatu	2·7	270	0 39a	− 6	1 15	− 4	—	—
Kohu	2·9	273	0 41	− 7	—	—	—	—
Sendai	2·9	341	0 45	− 3	1 19	− 5	—	—
Hatidyozima	3·0	218	1 2	P_g	1 50	S_g	—	—
Isinomaki	3·0	348	0 53	+ 3	—	—	—	—
Oiwake	3·0	286	0 51	+ 1	—	—	—	—
Shizuoka	3·1	260	0 58	P*	—	—	—	—
Yamagata	3·1	333	0 56	P*	1 35	S*	—	—
Matusiro	3·3	288	0 52	− 1	—	—	—	—
Omaesaki	3·3	254	1 12	P_g	2 10	?	—	—
Matumoto	3·4	284	0 55	0	1 43	S_g	—	—
Nagano	3·4	292	2 3	?	—	—	—	—
Niigata	3·4	316	1 6	P_g	1 55	S_g	—	—
Iida	3·5	272	1 0	+ 3	1 41	+ 1	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Takada		3·5	298	1 27	P_g	2 20	S_g	—	—	—
Hamamatu		3·7	259	1 22	P_g	2 2	S_g	—	—	—
Mizusawa		3·7	348	1 14	P_g	2 13	S_g	—	—	—
Sakata		3·8	332	0 37	?	1 12	?	—	—	—
Takayama		4·0	281	1 51	S	(1 51)	− 1	—	—	—
Miyako		4·1	359	1 3	− 2	2 24	S_g	—	—	—
Nagoya		4·2	267	1 17	+10	2 20	S_g	—	—	—
Morioka		4·3	350	1 12	+ 4	—	—	—	—	—
Gihu		4·4	270	1 27	P_g	—	—	—	—	—
Akita		4·5	340	1 25	P_g	—	—	—	—	—
Kanazawa		4·5	285	1 46	P_g	2 47	S_g	—	—	—
Kameyama		4·6	264	1 23	P*	2 32	S_g	—	—	—
Tu		4·6	262	1 34	P_g	2 39	S_g	—	—	—
Hikone		4·8	269	1 26	P*	2 30	S_g	—	—	—
Hukui		4·8	278	1 21	+ 6	—	—	—	—	—
Tsuruga		4·9	274	1 25	P*	—	—	—	—	—
Owase		5·1	255	1 30	P*	2 56	S_g	—	—	—
Aomori		5·4	349	1 48	P_g	2 55	S_g	—	—	—
Osaka		5·4	263	1 48	P_g	2 59	S_g	—	—	—
Siomisaki		5·6	251	0 58	?	2 25	− 8	—	—	—
Kobe		5·7	264	2 26	S	(2 26)	− 9	—	—	—
Toyooka		5·9	273	2 0	P_g	3 8	S_g	—	—	—
Urakawa		6·6	4	1 48	+ 7	2 48	−10	—	—	—
Kôti		7·3	257	1 51	+ 1	3 20	+ 5	—	—	—
Sapporo		7·6	356	2 9	P*	3 42	S*	—	—	—
Simidu		8·0	253	3 43	S	(3 43)	+10	—	—	—
Hamada		8·2	269	4 6	S*	—	—	—	—	—
Nemuro		8·3	18	3 24	S	(3 24)	−16	—	—	—
Ooita		9·0	258	1 51	−22	—	—	—	—	—
Hukuoka		9·8	262	5 5	S*	6 56	?	—	—	—
Vladivostok		11·0	317	i 2 37	− 5	i 4 45	− 2	—	—	—
Zi-ka-wei	z.	17·8	263	4 6	− 5	e 7 35	+ 7	—	—	9·2
Nanking		19·7	268	e 4 29	− 5	e 8 21	+11	—	—	e 10·6
Kabansk		30·1	315	e 6 10	− 3	e 11 6	− 6	—	—	—
Irkutsk		31·5	315	e 6 28	+ 2	e 11 36	+ 2	—	—	—
Chatra		47·3	276	e 8 44	+ 7	—	—	—	—	e 27·4
Ili		49·6	302	e 8 45	−10	—	—	—	—	—
College		50·1	32	e 8 57	− 2	e 16 8	− 2	e 19 29	SS	e 24·3
Rybach'e		50·6	300	e 8 45	−17	—	—	—	—	—
Naryn		51·0	299	e 9 9	+ 3	i 16 23	+ 1	—	—	—
Frunse		51·6	301	e 9 13	+ 3	e 16 32	+ 1	—	—	—
Andijan		53·8	299	e 9 26	0	16 58	− 3	—	—	—
Fergana		54·3	299	e 9 28	− 2	—	—	—	—	—
Khorog		55·5	295	e 9 45	+ 6	—	—	—	—	—
Tashkent		55·8	301	e 9 39	− 2	e 17 23	− 5	—	—	—
Sverdlovsk		56·7	321	e 9 44?	− 4	e 17 34	− 6	—	—	—
Stalinabad		57·3	298	i 9 49	− 3	e 17 41?	− 6	—	—	—
Samarkand		58·0	300	e 10 2	+ 5	—	—	—	—	—
Poona		62·0	274	e 9 26	−58	—	—	—	—	—
Bombay		62·6	275	e 10 29	+ 1	e 18 54	− 2	—	—	—
Resolute Bay	z.	63·9	15	e 10 34	− 3	—	—	—	—	—
Shemakla		70·3	307	11 19	+ 2	20 31	+ 2	—	—	—
Hungry Horse		72·5	43	e 11 28	− 2	—	—	—	—	—
China Lake	z.	77·4	55	e 11 59	+ 1	—	—	—	—	—
Overton	z.	79·1	53	e 13 13	+65	—	—	—	—	—
Pierce Ferry		79·6	53	e 12 8	− 2	—	—	—	—	—
Collmberg	z.	82·7	331	e 12 32	+ 5	—	—	—	—	—
Tucson		84·0	55	e 12 41	+ 8	—	—	—	—	—
Stuttgart		86·2	331	e 12 44?	0	—	—	—	—	e 48·1

Additional readings :—
Resolute Bay iZ =10m.42s., eZ =11m.16s.
China Lake eZ =12m.6s.
Long waves were also recorded at other European stations.

March 7d. Readings also at 0h. (College), 3h. (near Manila), 5h. (Hungry Horse and Overton), 6h. (Pavia and near La Paz), 7h. (Hungry Horse and near Tiflis), 12h. (Istanbul and Overton (2)), 13h. (Chatra), 14h. (near Athens), 15h. (China Lake, Overton, near Tortosa, near La Paz, and near Alicante), 16h. (Seven Falls, Shawinigan Falls, Chatra, and near Alicante), 17h. (Pasadena, Riverside, China Lake, Hungry Horse, Pierce Ferry, Shasta Dam, College, and near Alicante), 18h. (Puebla and near Tacubaya), 19h. (College), 20h. (Ottawa, Collmberg, and near Chilisk), 21h. (Puebla and near Tacubaya), 22h. (near Chilisk).

March 8d. 12h. 15m. 38s. Epicentre 37°·1N. 141°·8E. Depth of focus 0·005.
(as on February 25d.).

Intensity IV at Onahama; II-III at Shirakawa, Mito, Onagawa, Kakuda, Ose, Hokota, Makabe, and Minato.
Epicentre 37°·2N. 141°·6E. Depth 40km.

Seismological Bulletin of the Cent. Met. Obs., Japan, for March, 1951, Tokyo, 1951, p.62 with macroseismic chart.

A = −·6283, B = +·4944, C = +·6006; δ = −9; h = −1;
D = +·618, E = +·786; G = −·471, H = +·371, K = −·800.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.
Onahama		0·8	257	0 17a	0	0 27	− 2
Hukusima		1·2	302	0 21	− 1	0 35	− 3
Mito		1·3	236	0 23	0	0 38	− 2
Sendai		1·3	329	0 22a	− 1	0 38	− 2
Shirakawa		1·3	271	0 22	− 1	0 35	− 5
Inawasiro		1·4	289	0 24	0	0 40	− 3
Isinomaki		1·4	344	0 33	+ 9	—	—
Tyosi		1·5	209	0 37	+11	—	—
Tukubasan		1·6	237	0 28	+ 1	0 46	− 1
Utunomiya		1·7	250	0 26	− 2	0 45	− 5
Kumagaya		2·1	244	0 38	+ 4	0 58	− 1
Mizusawa	E.	2·1	346	0 36	+ 2	0 56	− 3
Tokyo		2·1	229	0 36	+ 2	1 0	+ 1
Maebasi		2·3	252	0 37	0	1 2	− 2
Sakata		2·4	320	0 42	+ 4	1 9	+ 2
Yokohama		2·4	226	1 8	S	(1 8)	+ 1
Miyako		2·6	3	0 38	− 3	1 8	− 4
Morioka		2·7	349	0 40	− 2	1 7	− 7
Hunatu		2·9	237	0 46	+ 1	—	—
Urakawa		5·1	8	1 9	− 7	—	—

March 8d. 15h. 12m. 6s. Epicentre 6°·2S. 154°·8E. (as on 1950, Oct. 25d.).

A = −·8996, B = +·4233, C = −·1073; δ = −2; h = +7;
D = +·426, E = +·905; G = +·097, H = −·046, K = −·994.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp m. s.		L. m.
Brisbane		21·2	184	i 4 48a	− 1	e 8 41	0	i 5 15	PP	e 10·7
Riverview		27·7	187	i 6 46	PP	i 10 36	+ 3	i 10 49	?	e 12·7
Auckland	N.	35·6	151	e 6 59	− 2	—	—	—	--	—
Cobb River	E.	38·3	158	e 7 22	− 2	e 13 12	− 7	—	—	—
Kaimata	N.E.	39·1	161	7 35	+ 4	—	—	—	—	—
Wellington		39·2	156	i 7 30a	− 1	e 13 42	+10	e 16 38	SSS	18·9
Christchurch		40·3	160	i 7 41	+ 1	e 14 14	+25	e 17 9	SSS	e 20·3
Bandoug		46·8	267	e 8 33	0	e 15 24	0	—	—	—
Djakarta		47·7	268	e 8 38	− 2	e 15 32	− 4	—	—	—
Zi-ka-wei	z.	49·0	322	e 8 51	+ 1	—	—	—	—	—
Vladivostok		53·3	340	e 9 22	− 1	e 16 52	− 2	—	—	—
Kabansk		71·0	331	11 22	0	e 20 39	+ 2	—	—	--
Irkutsk		72·3	330	e 11 30	+ 1	e 20 48	− 4	—	—	—
Chatra		73·2	300	i 11 35	0	e 20 56	− 6	—	—	—
College		82·4	21	i 12 25	0	—	—	i 12 46	pP	e 34·2

Continued on next page.

		△	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Poona		83·4	290	e 12 26	− 4	i 22 45	− 6	—	—	—
Bombay		84·4	290	e 12 36	0	e 22 58	− 3	—	—	—
Chilisk		84·5	315	e 12 39	+ 3	—	—	—	—	—
Almata II		85·1	314	12 42	+ 3	—	—	—	—	—
Ili		85·5	315	e 12 43	+ 2	—	—	—	—	—
Berkeley		88·2	53	e 12 54 a	0	—	—	e 13 7	pP	e 41·4
Lick	z.	88·6	52	e 12 57 a	+ 1	—	—	e 16 33	PP	—
Shasta Dam		88·6	49	i 12 57	+ 1	—	—	—	—	—
Victoria		89·2	42	e 12 59	0	—	—	—	—	41·9
Fresno	z.	90·0	53	e 13 4 k	+ 1	—	—	e 13 15	pP	—
Reno		90·4	51	e 13 6 a	+ 2	—	—	e 13 19	pP	—
Pasadena		91·0	56	i 13 8	+ 1	—	—	i 13 23	pP	e 41·9
Mount Wilson	z.	91·1	56	i 13 9	+ 1	—	—	e 30 33	PKKP	—
Tinemaha	z.	91·3	53	i 13 10	+ 1	—	—	—	—	—
China Lake		91·6	54	i 13 11	+ 1	—	—	e 30 32	PKKP	—
Riverside	z.	91·6	56	i 13 11	+ 1	—	—	i 13 25	pP	—
Palomar		92·0	57	i 13 13	+ 1	—	—	i 13 27	pP	—
Boulder City		93·9	55	i 13 22	+ 1	—	—	i 30 26	PKKP	—
Overton	z.	94·3	54	i 13 24	+ 1	—	—	e 17 10	PP	—
Pierce Ferry		94·6	55	i 13 25	+ 1	—	—	i 13 49	pP	—
Hungry Horse		95·4	42	e 13 27	− 1	—	—	e 17 6	PP	—
Tucson		97·0	58	e 13 37	+ 2	—	—	e 30 18	PKKP	—
Sverdlovsk		97·4	327	e 17 38	PP	e 24 6	[− 8]	—	—	—
Grahamstown	z.	117·2	228	i 18 48	[+ 1]	—	—	—	—	—
Ksara		117·4	304	e 20 5	PP	—	—	i 20 20	?	—
Cleveland	z.	119·0	46	i 18 52 k	[+ 1]	—	—	—	—	—
Pretoria	z.	119·2	237	i 18 52	[+ 1]	—	—	—	—	—
Ottawa		121·4	39	i 18 56	[+ 1]	—	—	—	—	61·9
Collmberg	z.	125·0	332	e 19 3	[+ 1]	—	—	—	—	—
Harvard		125·4	40	i 19 4	[+ 1]	—	—	—	—	e 63·0
Weston		125·6	40	i 19 4	[0]	—	—	—	—	e 60·6
Stuttgart	z.	128·6	332	e 19 10	[+ 1]	—	—	—	—	—
Chinchina		129·8	88	i 20 13	[+61]	e 22 35	PKS	—	—	—
San Juan		138·3	68	i 19 18	[−11]	i 23 3	PKS	i 19 28	PKP	—
Fort de France		143·7	73	e 19 37?	[0]	—	—	—	—	—
Tamanrasset	z.	146·1	303	i 19 43 a	[+ 2]	—	—	e 23 8	PP	—

Additional readings :—
Cobb River eE = 7m.33s. and 12m.39s.
Christchurch eQEN = 16m.49s.
Berkeley eEN = 20m.58s.
Lick iZ = 13m.31s.
China Lake iZ = 13m.32s.
Riverside eZ = 13m.32s., ePKKPZ = 30m.30s.
Palomar iZ = 13m.41s., iPKKPZ = 30m.30s.
Boulder City iPP = 17m.8s.
Pierce Ferry i = 13m.37s.
Tamanrasset iPKP$_2$Z = 20m.0s., epPKP?Z = 20m.8s.
Long waves were also recorded at Paris, De Bilt, and La Paz.

March 8d. Readings also at 0h. (College, Khorog, near Naryn, Almata, Almata II, Chilisk, Ili, Krasnogorka, and Andijan), 3h. (near Istanbul), 6h. (College (2)), 8h. (Overton), 9h. (Apia and near Hungry Horse), 10h. (near Andijan), 12h. (Ottawa and near Reykjavik), 13h. (China Lake, Hungry Horse, Overton (2), Tucson, Naryn, near Kurmenty, Almata II, and Chilisk), 14h. (Manila), 15h. (Krasnogorka, Samarkand, Tchimkent, near Khorog, Kulyab, Stalinabad, Fergana, and near Hungry Horse), 16h. (Auckland, Ottawa, near Huancayo, and near Reykjavik), 18h. (Ottawa, near Klyuchi, and near Kurmenty), 20h. (Pierce Ferry), 21h. (Calcutta, Poona, Pierce Ferry, and near Sofia), 22h. (Bombay, Chatra, College, near Istanbul, and near Bogota), 23h. (Samarkand, Naryn, near Kulyab, Khorog, Stalinabad, Fergana, Tashkent, Tchimkent, near Klyuchi, and near Apia).

March 9d. 7h. 11m. 11s. Epicentre 35°·5N. 140°·4E. Focus at base of superficial layers. (as on Jan. 31d.).

Intensity V at Tateno, Nishiikuta; IV at Tokyo, Yokohama, Utunomiya, Oshima, and neighbouring towns; II-III at Tukubasan, Tomisaki, Mito, and surrounding area.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for March, 1951, Tokyo, 1951, p.63. Macroseismic chart p.63.
Epicentre 35°·5N. 140°·2E. Depth 40-50km.

$A = -·6287$, $B = +·5201$, $C = +·5781$; $\delta = -3$; $h = 0$;
$D = +·637$, $E = +·771$; $G = -·445$, $H = +·368$, $K = -·816$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tyosi	0·4	58	0 16	+ 7	0 27	+11	—	—	—
Tokyo	0·6	289	0 14	+ 2	0 19	− 2	—	—	—
Mera	0·7	219	0 17k	+ 4	0 28	+ 5	—	—	—
Yokohama	0·7	264	0 16k	+ 3	0 24	+ 1	—	—	—
Tukubasan	0·8	341	0 14	− 1	0 23	− 3	—	—	—
Mito	0·9	3	0 19	+ 3	0 30	+ 2	—	—	—
Kumagaya	1·0	309	0 20a	+ 2	0 31	0	—	—	—
Osima	1·1	229	0 20	+ 1	0 31	− 2	—	—	—
Utunomiya	1·1	338	0 20	+ 1	0 34	+ 1	—	—	—
Misima	1·2	252	0 21k	+ 1	0 35	− 1	—	—	—
Titibu	1·2	294	0 20	0	0 34	− 2	—	—	—
Hunatu	1·3	270	0 21k	− 1	0 35	− 3	—	—	—
Kohu	1·5	275	0 22k	− 2	0 37	− 7	—	—	—
Onahama	1·5	16	0 29	+ 5	0 47	+ 3	—	—	—
Shirakawa	1·6	355	0 27	+ 1	0 48	+ 2	—	—	—
Oiwake	1·7	299	0 30	+ 2	0 49	0	—	—	—
Shizuoka	1·7	252	0 28k	0	0 49	0	—	—	—
Omaesaki	2·0	243	0 33k	+ 1	—	—	—	—	—
Matumoto	2·1	290	0 50	+17	1 13	+14	—	—	—
Matusiro	2·1	301	0 40	+ 7	—	—	—	—	—
Iida	2·1	270	0 34	+ 1	0 56	− 3	—	—	—
Nagano	2·2	203	0 47	+12	1 7	+ 6	—	—	—
Hamamatu	2·3	250	0 37	+ 1	1 5	+ 1	—	—	—
Hukusima	2·3	1	0 37k	+ 1	1 9	+ 5	—	—	—
Takada	2·4	313	0 28	−10	0 59	− 7	—	—	—
Niigata	2·7	336	0 54	+12	—	—	—	—	—
Yamagata	2·7	359	0 33	− 9	—	—	—	—	—
Nagoya	2·8	263	0 43	0	1 17	+ 1	—	—	—
Sendai	2·8	8	0 43k	0	1 16	0	—	—	—
Toyama	2·8	294	0 40	− 3	1 25	+ 9	—	—	—
Gihu	3·0	268	0 45	− 1	1 24	+ 2	—	—	—
Isinomaki	3·0	14	0 46	0	—	—	—	—	—
Aikawa	3·1	325	0 37	−11	1 16	− 8	—	—	—
Kanazawa	3·2	289	0 59	+10	1 37	+10	—	—	—
Kameyama	3·3	261	0 52	+ 1	1 24	− 5	—	—	—
Tu	3·3	258	0 47	− 4	1 25	− 4	—	—	—
Hikone	3·4	269	0 53	+ 1	1 30	− 2	—	—	—
Hukui	3·4	281	0 59	+ 7	—	—	—	—	—
Wazima	3·4	306	0 58	+ 6	—	—	—	—	—
Tsuruga	3·5	274	0 53k	0	1 32	− 2	—	—	—
Mizusawa	3·7	8	0 55	− 1	e 1 33	− 6	—	—	—
Owase	3·8	249	0 57a	− 1	1 45	+ 3	—	—	—
Kashiwara	3·9	255	1 27	+28	—	—	—	—	—
Kyoto	3·9	262	1 3	+ 4	1 49	+ 5	—	—	—
Osaka	4·1	260	1 1	− 1	1 57	+ 8	—	—	—
Akita	4·2	356	1 3	0	1 53	+ 1	—	—	—
Morioka	4·2	6	1 4	+ 1	1 51	− 1	—	—	—
Miyako	4·3	16	1 5	0	1 54	0	—	—	—
Siomisaki	4·3	244	1 4	− 1	1 37	−17	—	—	—
Kobe	4·4	259	1 4	− 2	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Toyooka		4·6	275	1 8	− 1	2 13	+11	—	—	—
Sumoto		4·7	257	1 9	− 1	2 3	− 2	—	—	—
Kôti		6·0	254	1 28	− 1	2 41	+ 4	—	—	—
Urakawa		6·9	15	1 31	−10	2 58	− 2	—	—	—
College		50·8	52	e 8 57	− 2	—	—	i 9 8	pP	—
Apia		66·7	128	—	—	i 36 32	?	—	—	—
Hungry Horse		73·5	52	e 11 30	− 1	—	—	—	—	—
China Lake	z.	78·5	54	e 11 58	− 1	—	—	e 12 15	pP	—
Overton	z.	80·2	52	i 12 8	− 1	—	—	e 12 28	pP	—
Pierce Ferry		80·7	52	i 12 10	− 1	—	—	—	—	—
Tucson		85·2	54	e 12 37	+ 3	—	—	—	—	—

March 9d. 10h. Undetermined shock.

Huancayo eP =15m.42s., eS =16m.22s.
La Paz iP =16m.28s. a, P_g =17m.2s., iS =17m.57s., iSS =18m.20s., iLZ =18m.28s.
Bogota iP =19m.24s., i =19m.38s., iS =23m.14s.
Chinchina eP =19m.28s., iP =20m.36s., eSEN =23m.11s., eLEN =25m.0s.
La Plata PEN =20m.6s., SEN =25m.28s., LN =27·4m.
Tucson eP =24m.38s.
Palomar eZ =25m.12s.
Pierce Ferry eP =25m.12s.
Riverside eZ =25m.13s.
China Lake ePZ =25m.17s., iZ =25m.30s. and 25m.48s.
Mount Wilson eZ =25m.17s.
Overton eP?Z =25m.24s.
Tinemaha eZ =25m.33s.
Hungry Horse eP? =26m.8s.
Tamanrasset ePZ =27m.33s., iZ =27m.42s., eZ =29m.38s.
College eP? =28m.12s.

March 9d. 16h. 9m. 53s. Epicentre 20°·5S. 179°·0W. Depth of focus 0·080.
(as on 1950, Dec. 23d.).

A = −·9373, B = −·0164, C = −·3481 ; δ = −3 ; h = +5 ;
D = −·017, E = +1·000 ; G = +·348, H = +·006, K = −·937.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		9·6	47	2 18	+ 3	e 4 2	0	—	—	—
Wellington		21·4	193	i 4 7	− 3	7 19	−12	—	—	—
Cobb River	E.	21·7	197	e 4 10	− 3	e 7 24	−12	—	—	—
Kaimata	N.E.	23·4	198	4 26	− 2	i 7 51	−13	—	—	—
Christchurch		24·0	195	i 4 29	− 5	e 7 37	−36	—	—	—
Brisbane		26·4	250	i 4 58k	+ 3	e 8 51	0	—	—	—
Riverview		29·6	237	—	—	i 9 38	− 3	i 12 52	sS	—
Vladivostok		77·7	326	e 11 3	+ 1	i 20 17	+ 7	—	—	—
Berkeley	z.	78·8	43	i 11 8k	0	—	—	—	—	—
Lick	z.	78·9	43	i 11 9k	+ 1	—	—	e 14 16	pP	—
Mount Wilson	z.	79·5	47	i 11 11k	− 1	—	—	e 13 11	pP	—
Fresno		79·7	45	e 11 13k	0	—	—	e 13 35	pP	—
Palomar		79·8	48	i 11 13k	0	—	—	e 13 23	pP	—
Riverside	z.	79·8	47	i 11 13k	0	—	—	—	—	—
Shasta Dam		80·4	39	i 11 17	+ 1	—	—	—	—	—
China Lake	z.	80·7	46	i 11 17k	− 1	—	—	i 13 27	pP	—
Tinemaha	z.	80·9	45	i 11 19k	0	—	—	—	—	—
Reno	z.	81·3	42	e 11 21	0	—	—	—	—	—
Boulder City		82·7	47	i 11 28	0	e 20 58	− 2	—	—	—
Overton	z.	83·2	47	i 11 31	+ 1	—	—	i 13 41	pP	—
Pierce Ferry		83·3	47	i 11 31	0	e 21 4	− 2	14 9	pP	—
Tucson		83·6	52	i 11 33	+ 1	—	—	e 13 44	pP	—
Logan		87·6	43	e 11 51	− 1	—	—	e 13 59	pP	—
College		88·4	13	i 11 54	− 1	i 21 47	− 7	i 14 11	pP	—
Hungry Horse		89·7	37	i 12 0	− 1	—	—	—	—	—
Scoresby Sund	z.	128·2	10	e 18 1	[− 4]	—	—	—	—	—
Copenhagen		143·8	351	i 18 32	[− 2]	—	—	—	—	—
Ksara		146·4	301	i 18 42	[+ 4]	e 21 33	PKS	—	—	—
Uzhgorod		147·1	334	18 43	[+ 4]	—	—	—	—	—
Raciborzu	z.	147·5	340	i 18 44	[+ 4]	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Collnberg	z.	147·8	347	e 18 40	[0]	—	—	e 21 2 pPKP	—
Jena		148·5	347	e 18 40	[− 1]	—	—	e 18 55 PKP_2	—
Istanbul		148·6	317	e 18 45	[+ 4]	e 24 34	[−23]	e 21 1 pPKP	—
Prague		148·6	343	e 18 43	[+ 2]	—	—	e 18 52 PKP_2	—
Belgrade	z.	150·9	330	e 18 51k	[+ 6]	—	—	e 21 13 pPKP	—
Stuttgart	z.	151·0	350	e 18 45	[0]	—	—	e 21 17 pPKP	—
Strasbourg		151·4	351	e 18 46	[+ 1]	—	—	i 19 4 PKP_2	—
Paris		151·7	358	i 18 52	[+ 6]	—	—	— —	—
Besançon		153·0	353	e 18 47	[− 1]	—	—	i 19 11 PKP_2	—
Tamanrasset	z.	175·2	—	i 19 8a	[+ 1]	—	—	i 21 27 pPKP	—

Additional readings :—
Lick iZ =12m.8s.
College i =12m.25s., esP? =14m.57s.
Collmberg iZ =18m.44s.
Jena eEN =18m.46s., eN =19m.8s. and 19m.25s., eE =19m.30s.
Istanbul ePPZ =22m.20s.
Prague e =19m.40s., 19m.54s., and 20m.20s.
Stuttgart iPKP_2Z =18m.51s., eZ =19m.2s.
Strasbourg i =18m.52s.
Tamanrasset iPKP_2Z =20m.50s., ePPZ =24m.42s., esPPZ =27m.49s., eZ =30m.32s.

March 9d. 18h. 57m. 46s. Epicentre 39°·0N. 71°·8E. (as on 1940, Nov. 19d.).

A = +·2434, B = +·7402, C = +·6268 ; δ = +2 ; h = −1 ;
D = +·950, E = −·312 ; G = +·196, H = +·595, K = −·779.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Fergana	1·4	359	0 19	− 8	i 0 37	− 9
Khorog	1·5	186	i 0 31	+ 3	i 0 56	S_g
Andijan	1·8	14	0 31	− 1	0 58	+ 2
Kulyab	1·9	235	i 0 38	+ 4	i 1 8	S_g
Stalinabad	2·4	259	e 0 43	+ 2	i 1 13	+ 1
Tashkent	3·0	320	i 0 48	− 2	i 1 27?	0
Tchimkent	3·7	333	i 0 59	− 1	i 1 51	+6
Samarkand	3·8	281	e 1 2	+ 1	i 1 55	S*
Naryn	4·0	51	e 1 4	0	—	—
Frunse	4·4	28	i 1 11	+ 1	—	—
Rybach'e	4·7	42	e 1 15	+ 1	e 2 22	S*
Krasnogorka	5·0	30	e 1 15	− 3	—	—
Almata	5·7	41	e 1 27	− 1	e 2 36	+ 1
Almata II	6·0	43	e 1 34	+ 2	—	—
Ili	6·3	37	—	—	3 32	S_g
Kurmenty	6·3	48	i 1 52	P*	—	—
College	71·9	17	e 11 23	− 4	—	—

March 9d. 19h. 44m. 17s. Epicentre 8°·7S. 124°·1E. (as on 1951, February 14d.).

A = −·5543, B = +·8186, C = −·1503 ; δ = −6 ; h = +7 ;
D = +·828, E = +·561 ; G = +·084, H = −·124, K = −·989.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Bandong		16·4	275	i 3 58	+ 5	i 7 7	+11	— —	—
Djakarta		17·3	278	i 4 5a	+ 1	i 7 24	+ 8	— —	—
Manila		23·3	353	i 5 29	+19	e 7 45	?	— —	e 8·4
Perth		24·7	197	i 5 23	− 1	i 9 30	−14	6 6 PPP	—
Brisbane		33·1	128	i 6 34	− 6	e 11 33	−26	i 7 31 PP	—
Riverview		35·7	139	i 6 58k	− 4	i 12 34	− 5	i 7 11 pP	e 16·6
Zi-ka-wei	z.	39·8	357	7 40	+ 4	e 13 49	+ 7	i 9 20 PP	—
Nanking		40·8	353	7 47a	+ 2	e 13 54	− 2	— —	17·4
Hukuoka		42·5	9	e 7 59	0	e 14 20	− 2	e 17 24 SS	—
Kôti		43·0	11	e 8 2	− 1	e 14 38	+ 9	10 29 PPP	18·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Osaka		44·5	13	e 8 20	+ 5	e 14 42	− 9	—	—	e 18·3
Kameyama		44·9	14	e 8 21	+ 3	e 15 16	+20	—	—	18·6
Nagoya		45·3	15	e 8 25	+ 4	e 15 15	+13	—	—	18·9
Gihu		45·5	15	8 25	+ 2	15 14	+ 9	—	—	19·4
Tokyo		46·6	17	e 9 12	+40	e 15 6	−15	—	—	—
Calcutta	E.	46·8	312	e 8 37	+ 4	i 15 29	+ 5	i 10 29	PP	22·0
Toyama		46·8	14	e 8 37	+ 4	e 15 35	+11	(e 19 36)	SSS	e 19·6
Kumagaya		46·9	17	e 8 40	+ 6	e 15 11	−14	(e 19 39)	SSS	e 19·6
Matusiro		46·9	15	8 29	− 5	14 25	−60	(18 43)	SS	18·7
Utunomiya		47·4	17	e 8 39	+ 1	e 15 39	+ 7	(19 43)	SSS	19·7
Shirakawa		48·0	17	e 8 45	+ 2	e 15 44	+ 3	(19 55)	SSS	19·9
Onahama		48·0	18	e 8 56	+13	e 15 53	+12	(e 20 11)	SSS	e 20·2
Hukusima		48·7	17	8 57	+ 9	e 15 54	+ 4	—	—	e 20·0
Sendai		49·3	17	e 9 0	+ 7	e 16 0	+ 1	—	—	e 20·3
Kodaikanal	E.	50·1	292	i 8 58	− 1	i 16 9	− 1	10 58	PP	22·4
Mizusawa		50·2	17	9 5	+ 5	e 16 20	+ 9	16 28	PPS	—
Chatra		50·3	316	i 8 58	− 2	16 13	0	16 31	PPS	24·0
Akita		50·4	16	e 9 5	+ 4	e 16 27	+13	—	—	e 21·9
Hyderabad		52·1	300	i 9 12	− 2	i 16 33	− 5	11 31	PP	25·3
Vladivostok		52·1	7	i 9 16	+ 2	i 16 41	+ 3	—	—	—
Kaimata	N.E.	53·4	137	e 9 26	+ 2	—	—	—	—	—
Auckland	N.	53·7	129	e 8 53?	−33	—	—	—	—	e 23·1
Cobb River	E.	53·7	135	e 9 23	− 3	—	—	—	—	—
Christchurch		54·6	138	9 29	− 3	17 5	− 6	e 19 18	ScS	25·9
Wellington		55·2	135	i 9 33k	− 4	e 16 55	−25	e 11 30	PP	23·2
Poona		56·5	299	i 9 41	− 5	17 32	− 5	10 40	PcP	26·1
Bombay	E.	57·5	298	e 9 52	− 1	e 17 49	− 1	12 0	PP	26·5
New Delhi		58·5	311	e 9 48	−12	e 17 47	−16	19 54	ScS	26·7
Dehra Dun	N.	58·8	313	e 8 43	?	e 18 43	PPS	—	—	e 30·9
Kabansk		62·3	349	10 29	+ 3	e 18 55	+ 3	—	—	—
Irkutsk		63·1	347	e 10 31	− 1	e 18 58	− 4	—	—	—
Kurmenty		66·2	325	i 11 6?	+14	—	—	—	—	—
Chilisk		66·5	326	e 10 49	− 5	—	—	—	—	—
Naryn		66·6	323	i 10 52	− 2	i 19 39	− 6	—	—	—
Almata II		66·9	326	e 10 55?	− 1	—	—	—	—	—
Almata		67·1	326	i 10 52?	− 5	i 19 45?	− 6	—	—	—
Khorog		67·2	317	i 10 58	0	i 19 50	− 2	—	—	—
Rybach'e		67·2	324	i 10 57	− 1	i 20 13	PS	e 13 20	PP	—
Ili		67·5	326	i 10 57?	− 3	—	—	11 1	P	—
Frunse		68·3	323	i 11 5	0	i 20 3	− 3	—	—	—
Andijan		68·4	320	e 11 2	− 4	i 20 3	− 4	—	—	—
Fergana		68·6	320	e 11 4	− 3	—	—	—	—	—
Kulyab		68·6	317	e 11 2	− 5	e 20 2	− 7	—	—	—
Stalinabad		69·7	317	i 11 12	− 2	i 20 16	− 6	—	—	—
Tashkent		70·7	319	i 11 19	− 1	—	—	—	—	—
Tchimkent		71·0	320	i 11 21	− 1	i 20 36	− 1	—	—	—
Samarkand		71·4	317	e 11 24	0	e 21 34	ScS	—	—	—
Klyuchi		71·5	21	e 11 35	+11	e 21 33	ScS	—	—	—
Tananarive		74·6	253	11 42	− 1	e 21 22	+ 4	22 3	PS	35·7
Ashkabad		76·8	312	e 11 58	+ 3	—	—	—	—	—
Sverdlovsk		83·3	330	i 12 30	0	22 48?	− 2	—	—	—
Baku		83·8	312	e 12 34	+ 2	e 23 6	ScS	—	—	—
Lenkoran		84·1	310	12 35	+ 1	—	—	15 52	PP	—
Shemakla		84·8	312	12 40	+ 3	23 1	− 4	—	—	—
Kirovobad		86·5	311	12 49	+ 3	i 23 29	ScS	—	—	—
Nakichevan		86·8	310	e 12 57?	+10	i 23 39	ScS	—	—	—
Grozny		87·5	314	e 12 53	+ 2	—	—	—	—	—
Tiflis		87·8	313	e 12 51	− 1	e 23 29	− 5	—	—	—
Gori		88·4	313	e 12 53	− 2	e 23 31	− 9	—	—	—
Pietermartizburg	z.	89·0	240	e 12 57	− 1	—	—	i 13 2	PcP	—
Pretoria	z.	91·5	244	i 12 36	−34	—	—	—	—	—
Ksara		93·3	303	e 13 1	−17	24 57	ScS	—	—	—
Moscow		95·1	326	e 13 26	0	e 24 4	[+ 2]	24 33	S	—
Yalta		96·0	314	e 13 20	−10	—	—	e 17 25	PP	—
Helwan		96·7	299	e 13 52	+19	24 54	+ 1	27 1	PPS	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
College		97·0	26	e 13 30	− 5	24 30	{− 3}	e 17 24	PP		e 40·9
Istanbul		99·4	311	e 13 44	− 2	e 24 18?	[− 6]	e 17 41	PP		e 39·7
Pulkovo		99·4	329	e 17 42	PP	e 24 20	[− 4]	e 20 5	PPP		—
Kishinev		99·9	318	—	—	e 25 4	−16	—	—		—
Helsinki		102·0	330	e 27 17	PS	—	—	—	—		e 43·7
Sitka		103·0	34	e 27 57	PPS	e 24 45	[+ 4]	i 33 4	SS		i 42·6
Lwow		103·1	319	e 18 19	PP	e 24 25	[−17]	e 20 30	PPP		—
Uzhgorod		104·3	318	e 22 7	PKS	e 26 1	+ 5	i 27 45	PS		—
Skalnate Pleso		105·6	319	e 18 49	PP	e 25 1	[+ 8]	e 27 46	PS		—
Upsala		105·7	330	e 14 13	− 1	e 24 52	[− 2]	e 27 53	PS		e 46·7
Belgrade		105·8	314	e 18 40a	PP	e 25 2	[+ 8]	—	—		e 58·4
Budapest		106·5	317	e 18 43?	PP	25 43?	{+ 2}	e 28 3	PS		52·7
Kalossa		106·7	317	e 19 56	?	—	—	—	—		—
Ogyalla		107·1	318	e 20 58	PPP	e 33 55	SS	e 27 55	PS		—
Prague		109·2	321	e 19 3	PP	e 25 3	[− 6]	e 29 27	PPS		e 48·7
Copenhagen		109·3	327	e 18 38	[+ 6]	38 43	SSS	34 55	SSP		53·7
Potsdam		109·6	323	e 19 14	PP	—	—	—	—		e 51·7
Collmberg		109·9	321	e 18 32	[− 1]	e 29 5	PPS	e 19 9	PP		e 54·2
Messina		109·9	308	e 19 6	PP	e 25 17	[+ 5]	e 28 45	PS		—
Resolute Bay		110·4	10	e 18 39	[+ 5]	25 19	[+ 5]	e 19 15	PP		—
Triest		110·4	316	e 17 34	[−60]	e 28 39	PS	e 29 52?	PPS		e 51·8
Cheb		110·5	321	e 19 17	PP	e 25 12	[− 2]	e 34 37	SS		—
Jena	E.	110·9	322	e 18 17?	[−18]	—	—	e 19 21	PP		—
Rome		111·7	312	e 19 27	PP	e 25 21	[+ 2]	e 29 56	PPS		—
Seattle		112·2	42	—	—	e 26 26	{+ 6}	e 35 41	SS		e 52·7
Stuttgart		112·8	319	e 18 37	[− 2]	e 35 7	SS	e 19 31	PP		59·7
Ukiah		113·0	51	—	—	e 26 47	{+21}	e 34 35	SS		e 46·0
Shasta Dam		113·4	49	e 18 40	[0]	—	—	e 15 8	P		—
Pavia		113·6	316	e 20 47	?	e 38 59?	SSS	e 29 8	PS		e 45·7
Zürich		113·6	319	18 38	[− 2]	—	—	e 19 10	PP		—
Strasbourg		113·8	320	e 19 21?	PP	e 35 37	SS	e 29 16	PS		e 54·7
Berkeley		113·9	53	e 18 58	[+17]	e 35 25	SS	e 29 13	PS		i 47·8
Basle		114·2	319	11 42	?	—	—	—	—		e 66·7
Santa Clara		114·2	53	e 32 58	PKKS	—	—	—	—		e 61·9
De Bilt		114·4	324	i 19 48	PP	e 35 43	SS	e 29 33	PKKP		e 55·7
Lick	Z.	114·5	53	i 18 46k	[+ 4]	—	—	i 19 46	PP		—
Scoresby Sund		114·7	348	e 18 37	[− 5]	e 31 25	PPS	e 29 25	PKKP		—
Besançon		115·3	319	e 18 51	[+ 7]	—	—	e 19 57	PP		—
Fresno	Z.	116·0	53	e 18 49	[+ 4]	—	—	e 20 5	PP		—
Aberdeen	E.	116·4	331	i 19 7	[+21]	i 40 38	SSS	i 31 9	PPS		56·0
Paris		117·1	321	i 18 47	[0]	i 25 41	[+ 1]	i 20 2	PP		53·7
Tinemaha	Z.	117·2	53	e 18 53	[+ 6]	—	—	—	—		—
Hungry Horse		117·4	40	e 18 46	[− 2]	—	—	e 15 29	P		—
Pasadena		117·7	56	i 18 49	[+ 1]	i 36 37	SS	e 29 49	PS		e 49·3
Kew		117·8	325	e 20 19	PP	e 36 23	SS	e 31 5	PPS		e 57·7
China Lake	Z.	117·9	54	i 18 51	[+ 2]	—	—	e 29 3	PKKP		—
Riverside	Z.	118·4	56	e 18 52	[+ 2]	—	—	e 29 7	PKKP		—
Palomar	Z.	118·9	57	e 18 51	[0]	—	—	i 29 12	PKKP		—
Tamanrasset	Z.	119·6	292	e 18 50	[− 2]	e 25 39	[−10]	e 22 34	PKS		—
Boulder City		120·1	53	e 18 56	[+ 3]	—	—	e 18 28	?		—
Bozeman		120·2	42	—	—	27 22	{+ 7}	e 36 50	SS		e 47·9
Overton	Z.	120·3	53	i 18 56	[+ 3]	—	—	i 29 5	PKKP		—
Rathfarnham Castle		120·3	329	e 19 33	[+40]	—	—	e 24 41	?		e 55·7
Pierce Ferry		120·7	53	i 18 57	[+ 3]	—	—	—	—		—
Logan		120·9	46	e 18 56	[+ 1]	e 32 6	PPS	e 20 31	PP		—
Alicante		122·3	311	18 45	[−12]	25 24	[−34]	20 21	PP		e 59·9
Tucson		124·1	57	e 19 1	[0]	e 26 1	[− 2]	e 42 20	SSS		e 50·3
Almeria		124·2	310	e 19 0	[− 1]	30 50	PS	20 54	PP		72·7
Toledo		124·5	313	18 56	[− 5]	—	—	e 32 55	PcPPKP		60·7
Granada		125·0	309	19 4	[+ 2]	—	—	—	—		69·3
Rapid City	E.	126·0	40	e 19 25	[+21]	e 25 55	[−14]	e 37 58	SS		e 50·1
Lincoln	E.	131·8	41	e 22 34	PKS	—	—	—	—		e 72·5
La Plata		136·6	178	19 31	[+ 7]	28 37	{−24}	22 13	PP		68·4
Chicago		136·8	35	—	—	e 40 1	SS	e 29 45	SKKS		e 54·2
Tacubaya		136·8	72	e 19 32	[+ 7]	—	—	—	—		—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
St. Louis		137·1	40	e 19 25	[0]	37 44	?	e 21 56	PP	—
Ottawa		139·6	22	19 27	[− 3]	—	—	(40 49)	SS	40·8
Shawinigan Falls	N.	139·6	17	e 19 50	[+20]	—	—	—	—	—
Seven Falls	E.	139·7	15	e 19 42	[+12]	—	—	—	—	39·9
Cleveland		140·3	30	e 27 6	?	e 29 7	{−16}	e 41 27	SS	62·0
Morgantown		142·4	31	i 19 31	[− 4]	e 24 15	?	—	—	—
Pennsylvania		142·5	28	i 21 14	?	i 29 26	{−10}	e 33 37	PS	—
Harvard		143·6	19	i 19 34	[− 3]	—	—	—	—	e 66·9
Weston		143·8	19	e 20 24	[+47]	e 41 23	SS	i 20 37	PKP	e 66·4
Palisades		144·1	23	i 19 36	[− 2]	—	—	—	—	e 69·3
Fordham		144·2	23	i 19 37	[− 1]	—	—	—	—	—
Philadelphia		144·4	26	e 33 10	SKSP	e 42 0	SS	e 35 59	PPS	—
Washington	Z.	144·4	28	i 20 38	[+60]	—	—	e 23 2	PP	—
Columbia		145·8	38	i 19 43	[+ 2]	e 26 57	[+ 9]	e 41 36	SS	e 60·8
Huancayo		151·7	137	e 19 51	[+ 1]	e 30 35	{+ 8}	e 34 20	SKSP	e 62·5
La Paz		152·2	155	i 19 51	[0]	e 26 55	[− 2]	23 43	PP	78·2
Chinchina		160·1	99	i 20 1	[0]	e 31 21	{+ 8}	i 20 46	PKP_2	e 67·7
Bogota		161·5	101	e 20 8	[+ 6]	e 31 25	{+ 4}	e 21 0	PKP_2	79·7
San Juan		166·2	44	e 20 6	[− 1]	e 35 25	SKSP	e 21 8	PKP_2	e 60·8

Additional readings :—
Riverview iPPN =8m.19s., iPPPZ =8m.38s., iN =12m.40s. and 13m.9s., eNZ =13m.21s., iSSEN =14m.51s., iN =15m.2s. and 15m.28s.
Zi-ka-wei i =10m.43s.
Nanking i =7m.51s., eS?E =12m.43s.
Hukuoka eN =14m.15s., eE =17m.28s.
Tokyo eE =12m.11s., eN =13m.31s.
Calcutta iPcSE =14m.8s., iPSE =15m.38s., iPPSE =15m.45s., iSSE =18m.51s.
Kodaikanal PPPE =11m.55s., SSE =19m.54s., SSSE =20m.54s.
Chatra PcPN =10m.13s., PP =11m.2s., eS =15m.58s., ScSN =18m.15s., SSN =20m.13s., SSSN =21m.43s.
Hyderabad SSE =21m.6s.
Christchurch iZ =9m.44s., ipP?Z =9m.57s., PcPZ =10m.40s., SS =21m.23s., eSSS =23m.3s., eQEN =22·7m.
Wellington PcS? =13m.55s.
Poona PPEZ =11m.47s., PPPEZ =12m.58s., PcSEZ =14m.19s., SEZ =17m.16s., PSEZ =17m.24s., iEZ =18m.5s., ScSEZ =19m.0s., SSEZ =20m.56s., SSSEZ =23m.18s., QEZ =23m.30s.
Bombay PcPE =10m.56s., PPPE =13m.16s., iPSE =18m.4s., SSSE =23m.43s.
New Delhi iN =20m.31s.
Rybach'e ePcP =11m.16s.
Klyuchi e =12m.6s.
Tananarive ePcP =11m.49s., SS =26m.9s., SSS =29m.39s., Q =34m.27s.
Pietermaritzburg ePZ =13m.8s.
Moscow ePP =17m.13s.
Helwan eZ =17m.10s. and 18m.11s., eE =24m.13s., SE =25m.25s., eZ =27m.55s.
College e =13m.40s. and 17m.39s., ePKKP =30m.17s., eSS =31m.1s., eSSS =36m.31s.
Istanbul eZ =17m.26s., eE =24m.51s., eSEN =25m.1s.
Pulkovo eS =25m.0s.?, eSS =32m.13s.
Lwow ePS =27m.34s.
Skalnate Pleso eSKKS? =25m.50s., eN =26m.28s., e =28m.1s., ePPS =28m.56s., e =33m.25s., eSS =33m.59s.
Upsala ePP? =18m.58s., ePPP =21m.0s., eSE =25m.57s., eSN =26m.3s., eN =27m.21s., e =29m.0s., ePKKP?E =30m.5s., e =31m.13s., eE =32m.19s., eSS? =33m.15s., eE =33m.55s., eSSS? =37m.3s.
Belgrade iZ =20m.12s., eNE =30m.26s., eNW =35m.17s.
Budapest eE =23m.0s.
Ogyalla eE =21m.52s., ePPSE =28m.55s., eN =30m.25s., e =32m.43s. and 36m.13s., eSSS =38m.19s.
Prague eSKKS =25m.48s., ePS =28m.10s., eSS =34m.1s., eSSS =38m.1s. and many unidentified e readings.
Copenhagen e =26m.55s., 28m.43s., and 29m.37s.
Messina e =21m.53s.
Resolute Bay eZ =20m.8s. and 21m.18s., eE =26m.20s., e =28m.21s., eEN =29m.5s., eE =30m.5s., eEN =34m.8s. and 38m.10s.
Triest ePP =19m.48s.
Cheb eSKKS =25m.59s., ePS?E =28m.42s., ePPSE =29m.30s. and many unidentified e readings.
Jena eE =18m.25s., 19m.29s. and 20m.20s.
Rome ePS =28m.56s., eSS =33m.43s.
Seattle ePPS =31m.3s.

Continued on next page.

Stuttgart e =20m.6s., ePPPZ =22m.18s., e =23m.1s., ePS =28m.59s., ePKKP =29m.17s., e =30m.11s. and 31m.22s., eSSS? =38m.43s., eQ =55·7m.
Pavia e =22m.12s., eSS =34m.39s.?.
Strasbourg ePP =19m.40s., e =20m.3s., 29m.29s., and 31m.55s., eSSS =39m.24s., e =45m.15s.
Berkeley eZ =19m.4s. and 22m.32s., iS?N =27m.30s.
Besançon e =20m.52s.
Fresno eZ =19m.11s. and 20m.33s.
Aberdeen iPPE =23m.39s., iPPPE =26m.17s., eE =51m.6s.
Paris ePKS =22m.15s., ePPP =22m.31s., iSKS =25m.56s., iPS =29m.39s., iPPS =31m.5s., iPKP,PKS =41m.41s. and unidentified readings.
Hungry Horse ePP? =20m.15s., ePKKP =29m.11s.
Pasadena iZ =19m.8s., ePPZ =20m.45s., ePKKPZ =29m.18s.
Kew ePS =30m.7s., eEN =32m.7s., eSSSEN =42m.47s., eQEN =49·7m.
Tamanrasset iZ =18m.55s., ePPZ =20m.43s., eZ =29m.4s., ePPSZ =31m.59s., eSSZ =36m.20s.
Bozeman eSSS =42m.14s.
Pierce Ferry i =19m.9s.
Alicante PPP =22m.48s., PS =29m.16s., PPS =30m.44s., SS =35m.52s., SSS =40m.30s., Q =51m.36s.
Tucson e =19m.27s., ePP? =21m.13s., ePKS =22m.50s., ePS =30m.53s., eSS? =36m.20s.
Almeria SS =37m.54s.
Toledo e =20m.39s.
Granada PKP =22m.4s., PP =24m.25s., PPP =27m.4s., SKKS =29m.58s., ePS =33m.39s., SS =39m.43s. Readings wrongly identified.
Rapid City ePPE =21m.7s.
Lincoln eSSS?E =45m.35s.
La Plata PKSE =22m.49s., PKSN =22m.55s., PPPN =25m.13s., PPPE =25m.25s., N =37m.1s., SSN =39m.55s., SSE =40m.25s., N =43m.25s., SSSN =44m.25s., QE =59·4m.
Tacubaya e =20m.0s., eSKSP? =48m.13s., e =49m.9s.
Pennsylvania iPPN =23m.3s., iPKSE =24m.15s., iE =25m.11s., iN =27m.37s., 30m.18s., and 31m.7s.
Philadelphia ePPPS =37m.42s.
Washington iZ =21m.19s.
Columbia eSSS =46m.26s.
La Paz PKP_2Z =20m.1s., iZ =24m.10s., iSKKS =31m.15s., iSS =43m.19s., iSSP =44m.11s., Q =72m.25s.
Huancayo iPKP =19m.56s., ePP =23m.24s., eSS =42m.48s.
Chinchina eSKP =24m.22s., eSSSEN =46m.6s.
Bogota eSKS =26m.53s., ePSKS =35m.21s.
San Juan ePP =25m.12s., e =26m.51s., iPPP =28m.33s., i =30m.8s., 33m.7s., and 42m.53s.
Long waves were also recorded at Ivigtut, Clermont-Ferrand, Taranto, Tortosa, Saskatoon, Victoria, and Tuai.

March 9d. Readings also at 1h. (Ottawa), 2h. (College and near Balboa Heights), 3h. (Andijan, Kulyab, near Khorog, Stalinabad, and near Shasta Dam), 4h. (near (Mizusawa), 5h. (near Kurmenty, near Bandong (2), and Djakarta (2)), 6h. (Puebla, Vera Cruz, near Tacubaya, Scoresby Sund (2), and near Hungry Horse), 7h. (Tacubaya, Tuai, near Christchurch, Cobb River, Kaimata, and Wellington), 10h. (near Andijan), 11h. (College and near Andijan), 12h. (near Andijan), 14h. (Ottawa, Apia, College, Yuzno-Sakhlinsk, and near Vladivostok), 15h. (Kurmenty and College), 16h. (College and near Tacubaya), 18h. (near Manila, Huancayo, College, and Resolute Bay), 20h. (near Klyuchi, Brisbane, Stuttgart (2), Tamanrasset, Pasadena, Riverside, Palomar, Tinemaha, China Lake, Boulder City, Overton (2), Pierce Ferry (2), Shasta Dam, Tucson, and College), 21h. (Tamanrasset, near Basle, and Zürich), 22h. (Klyuchi and Yuzno-Sakhlinsk), 23h. (Brisbane and Wellington).

March 10d. 2h. Undetermined shock. South-West Pacific.

Pasadena gives depth 600km.

Apia ePEN =6m.43s.?, iSEN =8m,26s.
Berkeley ePZ =15m.31s., eZ =15m.37s.
Pasadena iPZ =15m.34s.k.
Fresno ePZ =15m.37s.k.
Riverside iPZ =15m.37s.k.
Palomar iP =15m.37s.k, iZ =15m,51s.
Shasta Dam iP =15m.40s.
China Lake iPZ =15m.42s.k.
Tinemaha iPZ =15m.44s.k.
Reno ePZ =15m.45s.k, epPZ =17m.48s.
Boulder City iP =15m.52s.
Overton iPZ =15m.55s.
Pierce Ferry iP =15m.55s.
Tucson iP =15m.57s., e =16m.14s.
Logan eP? =16m.16s., e =16m.35s.
College iP =16m.18s., ipP =18m.31s.
Hungry Horse eP =16m.24s.
Collmberg eZ =23m.8s.
Stuttgart ePKPZ =23m.8s., ePKP$_2$Z =23m.16s., eZ =23m.26s.
Jena eN =23m.9s.?, eEN =23m.12s., eE =23m.17s.
Strasbourg ePKP =23m.16s.
Paris ePKP$_2$? =23m.29s.
Tamanrasset ePKPZ =23m.31s., ePKP$_2$Z =25m.14s.
Besançon ePKP$_2$? =23m.35s.

March 10d. 8h. 10m. 17s. Epicentre 40°·4N. 124°·2W. (as on 1950, Jan. 14d.).

Intensity VI at Ferndale; V at Bridgeville, Charlotta, Fields Landing, Loleta; IV at Arcata, Fortuna, and Gaberville. Epicentre 40°·3N. 124°·3W.

L. M. Murphy and W. K. Cloud.
U.S. Earthquakes, 1951, Serial 762, Washington, 1953, p.10.

A = −·4293, B = −·6316, C = +·6456; δ = +2; h = −2;
D = −·827, E = +·562; G = −·363, H = −·534, K = −·764.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Shasta Dam		1·4	78	i 0 26	− 1	i 1 25	?
Santa Clara		3·5	150	e 1 0	+ 3	—	—
Tinemaha	z.	5·7	124	i 1 33	+ 5	i 3 2	S_e
China Lake	z.	6·9	129	i 1 45	0	—	—
Pasadena		7·9	140	i 1 55	− 4	i 3 35	+ 5
Riverside	z.	8·4	137	i 2 2	− 4	—	—
Overton	z.	8·6	114	—	—	e 4 21	S*
Hungry Horse		10·8	39	i 2 38	− 1	—	—
Tucson		13·5	123	e 3 15	0	—	—

Long waves were recorded at College.

March 10d. 10h. 38m. 32s. Epicentre 38°·1N. 3°·7W. (given by A. Due Rojo S. J.).

Serious damage in the epicentral region. Intensity VIII at Bailen; VI-VII at Jaen; V-VI at Granada. Felt consistently throughout Portugal.

A. Due Rojo S. J.
El periodo sismico de la provincia de Jaen. Las Ciencias. Madrid, 1952, Vol. 17, No. 1, pp. 49-54, with macroseismic chart.

Die südspanischen Erdbeben von März bis August, 1951. Neues Jahrb. Geol, Palãontol. Monatsheft, Stuttgart, Jan. 1952, No. 1, pp. 4, 5.

Notas sismológicas de 1951. Trabajos cientificos del Observatorio de Cartuja. Serie B, Año VI, No. 51. Revista de Geofisica, No. 41, Madrid, 1952.

Movimientos sismicos en España durante el año 1951. Boletin de la Real sociedad Española de Historia Natural Tomo L.1, 1953, p.61.

A. Rey Pastor.
Estudio morfo-tectonico de la Falla del Quadalquiver.
Comision de Geografia sismica y Fisica del interior de la tierra. Madrid, May, 1954, with isoseismic chart in an appendix.

J. Bonelli.
Sobre un estudio del caracter sismico de la Falla del Quadalquivir. Symposium on seismic studies. Bulletin d' information de l'U.G.G.I., 2e année, No. 2, 1953, pp. 254-258.

$A = +\cdot7873,\ B = -\cdot0509,\ C = +\cdot6145;\quad \delta = +4;\quad h = -1;$
$D = -\cdot065,\ E = -\cdot998;\quad G = +\cdot613,\ H = -\cdot040,\ K = -\cdot789.$

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Granada		0·9	175	i 0 15	− 5	i 0 25	− 9	—	—	—
Malaga		1·5	202	i 0 9	−19	i 0 15	?	—	—	—
Almeria		1·6	142	i 0 22	− 8	i 0 44	− 7	—	—	—
Toledo		1·8	351	e 0 23	− 9	i 0 42	−14	i 0 38	P_g	—
Alicante		2·5	84	i 0 44	+ 1	i 1 16	+ 2	—	—	—
Tortosa		4·2	49	i 1 9	+ 2	i 2 31	S_g	1 26	P_g	—
Lisbon		4·3	283	1 2_a	− 6	i 1 47	−13	1 21	PP	i 2·2
Averroes		5·6	213	e 1 26?	− 1	i 2 30	− 3	—	—	—
Barcelona		5·6	52	1 27	0	i 3 13	S_g	—	—	4·2
Clermont-Ferrand		9·2	31	i 2 16	0	i 4 25	SS	i 2 39	PPP	—
Besançon		11·6	35	e 2 54	+ 4	e 5 23	+22	i 5 32	SS	i 6·4
Paris		11·6	21	e 2 50	0	i 5 20	+19	i 3 2	PP	i 5·9
Pavia		11·9	50	e 3 43	?	e 4 57	−12	—	—	e 7·1
Neuchatel		11·9	38	e 2 58	+ 4	—	—	—	—	e 6·6
Zürich		12·9	40	e 3 11	+ 4	e 5 36	+ 3	—	—	—
Bologna		13·0	56	e 2 42	−27	—	—	e 3 56	PPP	—
Salo	z.	13·0	50	e 3 10	+ 1	—	—	e 3 46	PPP	e 8·1
Chur		13·1	44	e 3 14	+ 4	—	—	—	—	e 7·6
Padova		13·4	56	e 3 45	+31	e 6 37	Q	—	—	e 7·7
Strasbourg		13·4	35	e 3 15	+ 1	e 6 8	+23	e 3 35	PP	i 7·0
Kew		13·6	9	e 3 26	+ 9	e 6 10	+20	—	—	e 6·5
Karlsruhe		14·0	35	e 3 28	+ 6	6 28	SS	—	—	e 9·0
Stuttgart		14·2	37	e 3 28	+ 4	e 6 30	SS	e 3 35	PP	e 9·2
Triest		15·0	54	e 3 42	+ 7	e 6 29	+ 6	e 3 51	PP	—
Rathfarnham Castle		15·3	354	i 3 43	+ 4	i 6 52	SS	e 4 8	PP	e 8·5
Sonneberg		16·2	36	e 3 58	+ 8	e 7 10	+19	—	—	e 8·6
Cheb		16·6	39	e 3 58?	+ 2	e 7 20	+20	e 4 14	PP	e 8·4
Durham	E.	16·7	4	—	—	i 7 21	+18	i 7 41	SS	i 9·4
Jena		16·8	35	e 4 0	+ 2	e 7 31	+26	e 4 8	PP	e 8·9
Tamanrasset	Z.	17·2	151	e 3 56	− 7	e 6 50	−24	e 7 3	S	e 13·4
Prague		17·6	40	e 4 4	− 4	e 7 41	+18	e 4 23	PP	e 11·0
Collmberg	Z.	17·7	37	e 4 12	+ 2	—	—	e 4 35	PP	e 10·0
Kalossa	N.	18·7	53	e 4 17	− 5	—	—	e 4 43	PP	e 8·8
Ogyalla		18·7	50	e 4 48	PP	e 8 4	+16	e 8 48	SSS	e 9·2
Aberdeen	E.	19·1	2	e 4 19	− 8	i 6 42	?	i 4 30	P	10·4

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Budapest		19·1	52	4 28	+ 1	e 8 14	+17	e 4 40	PP	e 12·3
Belgrade		19·3	62	e 4 30k	+ 1	e 8 11	+ 9	—	—	e 13·8
Raciborzu		19·7	43	e 4 35	+ 1	e 8 23	+13	e 4 50	PP	e 11·5
Skalnate Pleso		20·5	48	e 4 49	+ 7	e 8 38	+11	e 9 22	SSS	—
Copenhagen		20·7	25	e 4 53	+ 9	e 8 46	+15	—	—	11·5
Lwow		23·0	50	e 5 10	+ 3	i 9 14	0	—	—	—
Kishinev		25·4	57	e 5 38	+ 7	e 10 3	+ 7	—	—	—
Upsala		25·7	24	e 7 45	?	e 9 53	− 8	e 11 5	SS	e 13·6
Pulkovo		30·6	33	e 7 8	PP	e 13 16	?	16 47	ScS	—
Moscow		32·7	43	e 6 42	+ 6	—	—	—	—	—
Scoresby Sund	z.	33·8	348	i 6 47	+ 1	—	—	—	—	—
Sverdlovsk		45·5	44	e 8 22	− 1	—	—	—	—	—
Ashkabad		48·0	70	e 8 42	− 1	—	—	—	—	—
Weston		50·6	298	e 8 53	− 9	—	—	—	—	—
Harvard		50·7	298	e 8 56	− 7	—	—	—	—	—
Resolute Bay		54·0	342	e 9 24	− 4	—	—	e 11 16	PP	—
Tashkent		54·7	62	e 9 35	+ 2	e 17 11	− 2	—	—	—
Stalinabad		55·4	65	e 9 43	+ 5	—	—	—	—	—
Kulyab		56·4	66	e 9 50	+ 5	—	—	—	—	—
Fergana		56·8	62	e 9 52	+ 4	—	—	—	—	—
Andijan		57·0	62	e 9 53	+ 3	17 42	− 1	—	—	—
San Juan		57·3	269	i 9 44	− 8	—	—	—	—	—
Morgantown		57·6	298	i 9 48	− 6	—	—	—	—	—
Kabansk		71·7	38	e 11 23	− 3	—	—	—	—	—
College		73·6	345	e 11 33	− 4	—	—	—	—	e 29·7
Hungry Horse		74·0	320	i 11 34	− 5	—	—	—	—	—
Logan		77·1	313	e 11 51	− 6	—	—	—	—	—
La Paz		81·2	241	e 12 18	− 1	—	—	—	—	46·5
Overton	z.	82·0	310	i 12 19	− 4	—	—	i 15 27	PP	—
Pierce Ferry		82·0	310	i 12 19	− 4	—	—	i 15 26	PP	—
Boulder City		82·6	310	i 12 22	− 4	—	—	i 15 32	PP	—
Tucson		82·6	305	i 12 22	− 4	—	—	—	—	—
Huancayo		83·4	249	e 12 24	− 6	—	—	—	—	—
Shasta Dam		83·6	318	e 12 27	− 4	—	—	—	—	—
Tinemaha	z.	83·9	313	e 12 31	− 2	—	—	—	—	—
China Lake	z.	84·4	312	i 12 32	− 4	—	—	—	—	—
Fresno	z.	85·0	314	e 12 34k	− 4	—	—	—	—	—
Perris	z.	85·5	310	i 12 37	− 4	—	—	—	—	—
Riverside	z.	85·5	310	i 12 36	− 5	—	—	—	—	—

Additional readings :—
Granada iP = 9s., i = 32m. and 1m.7s.
Tortosa P_gN = 1m.36s., P_gS_g?N = 1m.52s., S_gE = 2m.35s., S_gEN = 2m.40s., S_gN = 2m.48s.
Lisbon EN = 2m.9s., iZ = 2m.17s.
Averroes eP = 1m.17s., iS = 2m.7s.? appears to be as an earlier shock.
Clermont-Ferrand i = 1m.49s., 3m.8s., 3m.29s., and 3m.43s.
Besançon e = 4m.5s., 4m.24s., and 4m.40s.
Paris PPP = 3m.16s., i = 4m.58s.
Salo eZ = 4m.34s.
Strasbourg ePPP = 3m.43s., e = 4m.3s., 4m.31s., 5m.28s., 6m.26s., 6m.31s., and 6m.41s.
Stuttgart eQ? = 7m.42s.
Triest $eP_gP_gP_g$ = 5m.1s.
Rathfarnham Castle iPZ = 3m.46s., eZ = 4m.17s.
Sonneberg eS?N = 7m.13s.
Cheb eE = 4m.7s., eSE = 7m.25s., eN = 7m.53s.
Jena ePP?N = 4m.11s., eN = 4m.48s.
Tamanrasset iZ = 3m.59s.
Prague ePPP? = 4m.38s., eSS = 8m.8s., eSSS? = 8m.35s., e = 9m.44s., 9m.59s., and 10m.6s.
Collmberg eZ = 9m.6s.
Kalossa eE = 4m.23s.
Ogyalla e = 5m.5s. and 5m.37s., eN = 5m.53s., eSS = 8m.24s., eSSSN = 8m.58s.
Aberdeen iE = 4m.54s., 5m.35s., and 8m.15s.
Budapest iN = 4m.43s., eE = 5m.43s., iE = 6m.49s., eN = 6m.58s. and 11m.21s.
Belgrade eZ = 4m.38s., eNW = 9m.15s. and 10m.15s.
Raciborzu eSN = 8m.31s., eN = 8m.45s.
Skalnate Pleso eE = 5m.45s., eN = 5m.51s., eSN = 8m.46s.
Upsala eN = 10m.11s. and 12m.2s.
San Juan i = 10m.3s.
Morgantown e = 10m.21s.
Long waves were also recorded at Messina, De Bilt, Potsdam, and Helsinki.

March 10d. 21h. 57m. 36s. Epicentre 15°·5S. 167°·1E. Depth of focus 0·020.
(as on 1950, October 27d.).

$A = -·9398$, $B = +·2152$, $C = -·2656$; $\delta = +8$; $h = +6$;
$D = +·223$, $E = +·975$; $G = +·259$, $H = -·059$, $K = -·964$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		17·7	225	i 4 0k	+ 2	e 7 26	+19	i 4 44	PP	—
Apia		20·5	89	i 4 28?	+ 1	i 8 7	+ 5	i 4 46	pP	—
Auckland	N.	22·3	164	i 4 46	+ 1	i 8 54	+20	—	—	—
Riverview		23·2	216	i 4 58a	+ 5	i 9 5	+15	i 5 24	pP	—
New Plymouth	E.	24·3	166	e 5 5	+ 1	e 10 5	88	—	—	—
Tuai	N.	24·8	162	e 5 6	− 2	e 9 21	+ 4	e 5 57	PP	—
Cobb River	E.	26·0	171	i 5 20	0	e 9 43	+ 7	—	—	—
Wellington		26·5	168	i 5 22	− 2	i 9 53	+ 8	e 5 44	pP	12·4
Kaimata	N.E.	27·2	173	i 5 31	0	e 9 58	+ 2	—	—	—
Christchurch		28·3	172	i 5 39	− 2	10 24	+10	6 26	PP	—
Guam		36·3	321	5 57	−53	—	—	—	—	—
Perth		49·3	241	i 9 34	PP	15 37	+10	10 54	PPP	—
Honolulu		50·2	45	i 8 38	− 3	i 16 33	+53	i 9 8	pP	e 19·9
Terre Adelie		54·0	193	i 9 9	− 1	i 14 9	PcS	i 9 40	pP	—
Manila		54·5	302	i 9 14	+ 1	—	—	i 9 38	pP	—
Bandong		58·8	273	e 9 46	+ 2	i 17 46	+12	—	—	—
Djakarta		59·7	273	e 9 49	− 1	i 17 51	+ 5	—	—	—
Zi-ka-wei		63·9	318	10 21	+ 3	18 44	+ 5	—	—	—
Nanking		66·2	317	i 10 26a	− 7	i 19 5	− 2	i 11 6	pP	21·9
Vladivostok		66·7	333	i 11 14	+38	i 20 1?	?	i 12 39	PP	—
Ukiah		84·6	48	e 12 15	− 1	e 22 25	− 3	e 15 41	PP	e 33·9
Arcata	N.	84·8	47	e 11 59	−18	e 22 10	−20	e 12 18	pP	—
Berkeley		84·8	50	i 12 16	− 1	e 22 31	+ 1	e 15 33	PP	—
Santa Clara		84·8	50	e 12 19	+ 2	i 23 35	PS	i 12 56	pP	e 43·6
Lick		85·0	50	e 12 18	0	e 22 42	+10	e 15 6	PP	—
Kabansk		85·1	328	12 20	+ 1	22 32	− 1	23 41	PS	—
Calcutta	E.	85·8	295	i 12 28a	+ 6	i 22 55	+15	i 13 2	pP	—
Shasta Dam		85·9	46	i 12 21	− 2	e 22 34	[+ 4]	e 23 32	sS	—
Fresno		86·2	51	e 12 22a	− 2	e 22 50	+ 6	e 12 58	pP	—
Pasadena		86·4	54	i 12 23a	− 2	e 22 55	+ 9	i 12 53	pP	i 39·1
Irkutsk		86·5	327	i 12 26	0	i 22 50	+ 3	i 14 0	sP	—
Sitka		86·9	28	i 12 21	− 7	i 22 40	−10	i 12 52	pP	i 35·3
Riverside		87·0	54	i 12 26a	− 2	i 15 44	PP	i 12 57	pP	—
College		87·1	18	i 12 25	− 4	i 22 37	[0]	i 13 4	pP	e 34·8
Palomar		87·2	55	i 12 27a	− 2	i 15 51	PP	i 12 59	pP	—
Reno		87·2	48	i 12 28a	− 1	e 22 46	− 7	—	—	—
Haiwee		87·3	52	i 12 28a	− 2	e 30 21	PKKP	e 38 22	P'P'	—
Tinemaha		87·4	51	i 12 28a	− 2	e 23 0	+ 5	i 12 58	pP	—
China Lake		87·5	53	i 12 27	− 4	—	—	—	—	—
Chatra		88·2	299	i 12 36	+ 2	22 50	[+ 5]	12 54	PcP	36·5
Victoria		88·5	39	i 12 32a	− 3	22 54	[+ 8]	e 16 0	PP	34·4
Seattle		88·8	40	i 12 36a	− 1	i 23 30	+22	i 13 14	pP	—
Boulder City		89·6	53	i 12 39	− 2	e 23 17	+ 2	i 13 6	pP	—
Overton	Z.	90·1	52	i 12 42	− 1	i 16 17	PP	i 13 16	pP	—
Pierce Ferry		90·3	53	i 12 43	− 1	e 23 7	[+ 9]	i 13 10	pP	—
Tucson		91·6	57	i 12 49	− 1	i 23 41	+ 8	i 13 24	pP	e 37·8
Kodaikanal	E.	92·3	281	12 58	+ 5	23 58	+19	i 13 40	pP	—
Hyderabad		93·3	287	13 3	+ 5	23 24	[+ 9]	24 32	PS	42·0
Salt Lake City		93·4	49	e 12 55	− 3	i 23 22	[+ 6]	e 16 54	PP	e 38·3
Logan		93·7	48	i 12 59	0	e 23 51	0	e 13 34	pP	e 38·7
Hungry Horse		94·2	42	e 12 59	− 3	e 23 21	[+ 1]	i 13 30	pP	—
Butte		94·5	43	e 13 17	+14	e 24 5	+ 7	e 17 52	PP	e 38·5
Guadalajara		95·0	70	e 13 52	pP	e 24 37	pS	e 25 20	sS	—
Bozeman		95·4	45	e 13 5	− 2	e 23 29	[+ 3]	e 16 51	PP	e 37·6
Dehra Dun	N.	96·9	299	—	—	e 24 12	− 7	e 31 42	SS	—
New Delhi		97·2	298	e 13 19	+ 4	24 23	+ 2	i 23 41	SKS	45·7
Poona		97·8	287	i 13 18	0	i 24 51	+25	14 20	sP	—
Tacubaya		98·4	72	e 14 8	pP	e 24 22	− 9	e 17 19	PP	—
Bombay	E.	98·8	287	e 13 32	+ 9	i 24 38	+ 3	i 17 23	PP	46·4
Puebla		99·3	72	e 16 40	?	e 25 56	SP	e 17 29	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kurmenty		99·6	312	i 13 38	+12	—	—	—	—	—
Saskatoon		99·8	39	e 17 35	PP	e 24 29	−14	e 23 47	SKS	35·2
Semipalatinsk		99·8	320	e 13 28	+ 1	—	—	—	—	—
Rapid City	E.	100·4	47	e 13 34	+ 4	i 25 0	+12	i 17 34	PP	—
Almata		100·6	312	i 13 32	+ 1	i 24 0	[+ 7]	i 14 8	pP	—
Ili		100·6	313	e 13 31	0	—	—	—	—	—
Naryn		100·9	310	i 13 35	+ 3	24 1	[+ 6]	i 17 49	PP	—
Rybach'e		101·0	312	i 13 36	+ 3	24 58	+ 5	e 17 45	PP	—
Vera Cruz		101·2	73	i 17 44	PKP	e 24 54?	− 1	i 18 31	pPP	—
Frunse		102·2	312	i 13 41	+ 3	24 8	[+ 7]	14 15	pP	—
Andijan		103·5	309	13 44	0	i 25 16	+ 2	i 14 18	pP	—
Fergana		103·9	309	e 13 46	+ 1	e 24 14	[+ 6]	14 22	pP	—
Lincoln	E.	104·6	51	e 18 6	PP	i 25 21	− 2	e 21 0	PPP	e 43·7
Kulyab		105·1	305	e 13 48	− 3	e 24 16	[+ 3]	—	—	—
Tchimkent		105·8	311	i 13 40?	P	i 24 6?	[−11]	—	—	—
Stalinabad		105·9	307	i 13 56	P	e 25 30	− 4	18 24	PP	—
Tashkent		105·9	310	i 13 53	P	i 24 26	[+ 9]	e 14 29	pP	—
Resolute Bay		107·0	15	i 13 59	P	e 24 15	[− 7]	e 17 54	PP	—
Merida		107·5	72	i 18 26	PP	e 25 35?	S	27 0?	sS	—
Florissant		109·2	54	i 17 39	?	24 42	[+10]	i 25 44	sSKS	—
St. Louis		109·3	54	e 14 17	P	25 17	S	e 18 39	PP	—
Tananarive		111·4	243	e 19 16	PP	25 54	SKKS	28 20	PS	52·4
Chicago		111·5	50	e 18 54	PP	i 25 46	SKKS	e 19 34	pPP	e 45·7
Sverdlovsk		111·8	326	e 14 22	P	i 24 49	[+ 7]	18 49	PP	—
Huancayo		112·4	111	e 18 19	[+ 2]	e 24 36	[− 9]	i 19 6	PP	e 45·1
Cincinnati		113·8	53	e 14 32	P	i 19 13	PP	e 15 12	pP	—
Ashkabad		114·1	305	e 18 24	[+ 4]	—	—	i 18 30	PP	—
La Plata		114·1	141	17 42	?	28 48	PS	19 12	PP	54·2
Cleveland		116·1	51	i 18 24	[0]	i 26 6	SKKS	i 19 6	pPKP	—
Columbia		116·5	59	e 19 35	PP	e 26 4	SKKS	i 28 12	sS	e 49·8
La Paz		116·9	118	i 18 30	[+ 4]	25 8	[+ 6]	i 19 38	PP	55·1
Morgantown		117·3	53	i 18 25	[− 1]	—	—	e 19 21	PP	—
Pittsburgh	Z.	117·3	51	(i 18 14)	[−12]	—	—	—	—	—
New Kensington	E.	117·5	51	e 18 57	[+30]	e 26 16	SKKS	i 27 30	S	e 47·4
Chinchina		117·6	92	i 18 23	[− 4]	e 26 10	SKKS	e 19 39	PP	e 55·8
Buffalo		118·0	49	18 29	[+ 1]	26 15	sSKS	19 6	pPKP	—
Grahamstown	Z.	118·6	217	i 18 32	[+ 3]	—	—	—	—	—
Pietermaritzburg	Z.	118·7	223	i 18 32	[+ 3]	—	—	—	—	—
Pennsylvania	E.	118·9	52	i 19 54	PP	i 25 16	[+ 7]	i 29 19	SP	—
Bogota		119·0	93	e 18 29	[− 1]	e 27 45	S	i 19 50	PP	—
Washington	Z.	119·6	53	i 18 30	[− 1]	e 32 32	SKKP	29 32	PKKP	e 44·9
Ottawa		119·9	46	18 31k	[0]	26 28	SKKS	19 48	PP	—
Baku		120·5	309	e 18 38	[+ 5]	e 25 26	[+12]	e 29 47	SKSP	—
Philadelphia		121·0	53	e 21 55	?	e 26 45	SKKS	i 27 48	S	e 46·9
Lenkoran		121·5	306	18 41	[+ 7]	26 44	SKKS	20 10	PP	—
Shemakla		121·5	308	i 20 12	PP]	—	—	—	—	—
Shawinigan Falls	N.	121·7	44	e 18 39	[+ 4]	—	—	—	—	—
Palisades		121·8	52	i 18 35	[0]	e 25 26	[+ 8]	i 20 6	PP	e 56·8
Fordham		121·9	52	i 18 35	[0]	i 29 3	S	i 20 8	PP	51·4
Pretoria	Z.	122·7	226	i 18 9	[−28]	—	—	—	—	—
Seven Falls	E.	122·9	43	18 42	[+ 5]	25 14	[− 8]	20 14	PP	45·3
Grozny		123·2	312	i 18 45	[+ 7]	i 27 6	SKKS	—	—	—
Harvard		123·3	49	i 18 38	[0]	e 27 55	SKKS	i 20 17	PP	e 48·4
Weston		123·5	49	i 18 38	[0]	e 29 2	S	e 37 22	SSP	e 51·6
Moscow		124·4	329	i 18 41	[+ 1]	25 35	[+ 8]	20 30	PP	—
Gori		124·6	310	e 19 23	pPKP	—	—	—	—	—
Scoresby Sund		124·8	4	e 18 42	[+ 1]	26 16	SKKS	i 20 28	PP	—
Abastumanj		125·6	310	e 18 51	[+ 9]	—	—	—	—	—
Pulkovo		125·8	334	i 18 44	[+ 1]	i 25 37	[+ 6]	—	—	—
Sotchi		127·4	314	18 55	[+ 9]	—	—	—	—	—
Helsinki		127·6	338	e 18 47	[+ 1]	e 26 56	SKKS	e 21 58	PKS	e 53·4
Ivigtut		127·8	21	i 18 45	[− 2]	22 3	PKS	37 42	SS	52·4
Halifax		128·5	45	22 8	PKS	26 36	[+58]	28 41	SKKS	—
San Juan		129·2	79	e 18 48	[− 1]	i 26 12	[+32]	i 21 2	PP	i 50·0
Theodosia		130·0	316	e 19 2?	[+11]	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Upsala		130·4	341	e 18 51	[− 1]	e 25 47	[+ 4]	e 19 56	pPKP	e	53·4
Reykjavik		131·0	6	i 18 55	[+ 2]	i 22 8	PKS	i 19 25	pPKP		—
Yalta		131·0	316	18 55	[+ 2]	—	—	—	—		—
Ksara		132·5	302	i 19 4?	[+ 8]	33 26	PPS	—	—		—
Kishinev		133·3	321	19 1	[+ 4]	—	—	—	—		—
Fort de France		133·5	84	e 18 54	[− 3]	e 32 20	PS	i 21 20	PP		—
Lwow		134·6	327	i 19 1	[+ 2]	e 22 34	PKS	i 19 38	pPKP		—
Copenhagen		135·4	341	i 19 2	[+ 1]	44 24	SSS	19 39	pPKP		62·4
Istanbul		135·7	314	i 19 4	[+ 3]	e 26 8	[+14]	e 22 10	PP		—
Bucharest		136·2	320	e 19 18	[+16]	i 26 38	[+43]	e 22 36	PP		37·4
Uzhgorod		136·2	325	e 19 3	[+ 1]	i 28 26	SKKS	i 22 26	PKS		—
Skalnate Pleso		136·9	328	e 19 6	[+ 2]	e 25 55	[− 1]	e 19 59	pPKP		—
Helwan		137·0	298	i 18 27a	?	i 21 55	PP	i 19 6	PKP		—
Raciborzu		137·3	331	e 19 9	[+ 5]	e 25 48	[− 9]	e 22 44	PKS		—
Aberdeen	E.	137·6	352	e 19 17	[+12]	26 32	[+34]	i 22 43	PKS		64·4
Potsdam		137·8	337	e 19 8	[+ 3]	i 22 41	PKS	e 19 52	pPKP	e	63·4
Timisoara		138·5	323	e 19 10	[+ 3]	—	—	e 22 42	PKS		—
Budapest		138·6	328	i 19 10	[+ 3]	28 43	SKKS	22 42	PKS		47·4
Collmberg		138·7	336	i 19 8	[+ 1]	e 26 43	[+44]	e 19 53	pPKP	e	63·9
Ogyalla		138·8	328	e 19 11	[+ 4]	e 26 7	[+ 7]	e 20 5	pPKP		—
Sofia		138·8	319	e 19 11	[+ 4]	—	—	e 22 7	PP		—
Prague		139·0	334	i 19 10	[+ 2]	i 26 10	[+10]	i 19 58	pPKP	e	52·9
Kalossa		139·2	327	e 19 8	[0]	—	—	e 21 31	PP		—
Belgrade		139·4	323	i 19 11k	[+ 3]	e 32 18	SKSP	e 22 47	PKS	e	70·2
Vienna		139·4	330	i 19 10	[+ 2]	—	—	i 22 37	PP		—
Jena		139·5	336	e 19 12	[+ 3]	e 22 4	PP	e 19 48	pPKP		—
Durham		139·8	350	e 19 18	[+ 9]	—	—	i 22 24	PP		—
Cheb		139·9	336	e 19 14	[+ 5]	e 26 13	[+12]	e 20 0	pPKP	e	56·4
Sonneberg		140·1	336	e 19 12	[+ 2]	e 22 34	PKS	e 22 9	PP		—
Athens		140·8	312	19 11	[0]	—	—	i 22 17	PP		—
De Bilt		140·8	343	e 19 7	[− 4]	e 40 24	SS	e 19 40	pPKP	e	64·4
Rathfarnham Castle		141·9	353	i 19 9	[− 4]	e 21 32	PP	i 19 45	pPKP		—
Stuttgart		142·2	336	i 19 12k	[− 1]	e 26 58	[+53]	i 19 46	pPKP	e	64·4
Karlsruhe		142·3	337	i 19 13	[− 1]	22 24	PKS	e 20 8	pPKP	e	63·4
Triest		142·5	330	i 19 16	[+ 2]	i 28 7	SKKS	i 22 47	PP		—
Strasbourg		142·9	338	e 19 11	[− 4]	e 28 58	SKKS	i 19 51	pPKP	e	65·4
Chur		143·6	335	e 19 14a	[− 2]	—	—	—	—	e	64·9
Zürich		143·6	336	i 19 13a	[− 3]	e 29 8	SKKS	e 22 22	PP		—
Basle		143·8	337	i 19 15	[− 1]	e 28 2	?	e 22 33	PP		—
Taranto		143·9	320	e 19 12	[− 4]	e 34 14	PPS	e 23 14	PKS	e	47·2
Salo		144·1	332	i 19 17a	[0]	i 22 59	PKS	i 20 0	pPKP		—
Padova		144·3	329	i 19 18	[+ 1]	29 12	SKKS	22 56	PKS		—
Neuchatel		144·5	337	e 19 17	[0]	—	—	—	—		—
Paris		144·5	343	i 19 17	[0]	i 28 24	SKKS	19 56	pPKP	e	65·4
Bologna		144·6	330	i 19 20	[+ 2]	e 22 50	PKS	—	—		—
Besançon		144·7	337	e 19 19	[+ 1]	—	—	i 19 55	pPKP		—
Pavia		145·0	333	i 19 20a	[+ 2]	i 26 8	[− 1]	i 20 13	pPKP	e	56·5
Florence		145·1	330	i 19 21	[+ 3]	e 29 16	SKKS	i 19 48	pPKP		—
Prato		145·1	330	e 18 48	[−30]	—	—	—	—		—
Rocca di Papa		145·8	326	i 19 24	[+ 4]	—	—	—	—		—
Rome		145·8	326	i 19 20	[0]	e 32 44	PSKS	e 41 37	SS		—
Messina		146·2	318	i 19 19	[− 1]	e 22 42	PKS	e 41 34	SS		—
Clermont-Ferrand		147·0	340	i 19 20	[− 2]	e 29 0	SKKS	i 22 7	PKS	e	37·4
Barcelona		151·1	337	19 35	[+ 7]	—	—	23 22	PP		—
Tortosa		152·2	338	i 19 33	[+ 4]	29 59	SKKS	19 51	PKP_2	e	66·4
Algiers Univ.	z.	154·5	329	i 19 35k	[+ 2]	e 23 33	PP	i 20 24	pPKP		—
Toledo		154·5	345	i 19 35	[+ 2]	—	—	e 23 37	PP		73·9
Alicante		154·8	338	19 41	[+ 8]	26 12	[−10]	20 10	PKP_2	e	68·8
Almeria		156·8	338	i 19 36	[0]	43 50	SS	i 23 50	PP		77·7
Granada		156·9	342	i 19 36k	[0]	i 26 11	[−13]	20 3	PKP_2	i	72·7
Malaga		157·6	343	i 19 37	[0]	26 33	[+ 8]	i 20 13	PKP_2		65·0
Tamanrasset	z.	161·2	295	i 19 43k	[+ 2]	e 29 41	SKKS	i 20 19	pPKP		—
Averroes		161·6	345	i 19 49	[+ 8]	i 24 18	PP	i 20 26	pPKP		—

For Notes see next page.

NOTES TO MARCH 10d. 21h. 57m. 36s.

Additional readings :—
Apia PPEN =5m.4s., iEN =5m.33s.
Riverview i =5m.3s., iPPN =5m.43s., iE =9m.10s., iN =9m.42s., 10m.4s., and 10m.29s., iE =10m.38s.
New Plymouth iE =5m.13s., eE =5m.53s. and 10m.9s.
Cobb River eE =9m.25s.
Wellington ePP =6m.2s., ePPP =6m.24s., SS =10m.34s., ScS =16m.4s.
Perth i =11m.42s., PS =16m.29s., SS =19m.24s., SSS =20m.36s.
Honolulu iPPP =11m.52s., eSS =19m.30s.
Terre Adelie ePPP =12m.38s., e =15m.42s.
Nanking i =10m.53s., 11m.12s., and 11m.58s., iPP =12m.58s., isS =20m.13s.
Vladivostok PS =20m.39s.
Ukiah esS =23m.25s., ePS? =24m.22s., eSS =28m.30s.
Arcata eN =22m.29s.
Berkeley eZ =12m.49s. and 17m.22s., iEN =23m.29s., iSSN =29m.6s., iN =34m.30s., ePKP,PKPZ =38m.28s.
Santa Clara esSE =24m.22s.
Calcutta PPPE =17m.35s., SKSE =22m.48s., PSE =23m.44s., isSE =23m.59s., SSE =28m.30s., SSSE =32m.0s.
Shasta Dam ePKKP =30m.24s., ePKP,PKP =38m.25s.
Fresno eZ =15m.46s. and 23m.40s.
Pasadena isPZ =13m.5s., iPP =15m.43s., eSZ =22m.55s., iSPE =23m.38s., iE =24m.36s., ePKKPZ =30m.25s., iQN =34·9m., ePKP,PKPZ =38m.25s.
Irkutsk isS =23m.48s.
Sitka isP? =13m.28s., iPP? =16m.53s., iSKS =22m.31s., iSS =28m.34s.
Riverside iPKKPZ =30m.25s., ePKP,PKPZ =38m.24s., iZ =38m.37s.
College isP =13m.19s., i =13m.51s., ePP? =15m.41s., isS =23m.54s., iSS =28m.47s., ePKKP =30m.16s., eSSS? =33m.0s., iPKP,PKP =38m.26s., ePKP,PKP,PKP =58m.46s.
Palomar iEN =22m.55s. and 23m.45s., iPKKPZ =30m.25s., iPKP,PKPZ =38m.27s.
Reno eZ =13m.20s., eN =23m.56s.
Tinemaha iZ =13m.9s., eN =23m.57s., iPKKPZ =30m.23s., ePKP,PKPZ =38m.29s.
Chatra PPN =15m.24s., PPPN =17m.9s., eSN =22m.24s., PSN =23m.9s., PPSN =23m.47s., SSN =27m.1s., SSSN =29m.50s.
Victoria e =23m.58s.
Seattle isP? =13m.32s., ePP =16m.12s., ePPP =17m.54s., eSKS =23m.3s., eSP =24m.15s., eSS =29m.54s. and many other readings without given phase.
Boulder City iPP =16m.13s., eSKS =23m.0s., iPKKP =30m.19s., ePKP,PKP =38m.20s.
Overton ePKKPZ =30m.15s., iPKP,PKPZ =38m.21s.
Pierce Ferry ePP? =16m.6s., iPKKP =30m.14s., iPKP,PKP =38m.20s.
Tucson isP =13m.41s., iPP =16m.23s., isPP =17m.16s., eSKS =23m.5s., ipS =24m.17s., isS =24m.42s., ePKKP? =29m.46s., eSS =29m.54s., eSSS =33m.31s., iPKP,PKP =38m.17s.
Kodaikanal PPE =16m.43s., PPPE =18m.43s., iSKSE =23m.20s., PSE =25m.8s., PPSE =25m.43s., SSPE =30m.18s., SSSE =33m.58s.
Salt Lake City iS? =24m.26s., iPS =24m.55s., ePPS =26m.0s., eSS =29m.54s., eSSS =34m.12s.
Logan ePP =16m.37s., eSKS =23m.19s., ipS =24m.27s., e =24m.43s., isS =24m.57s., eSS? =29m.48s., eSSS =33m.55s., ePKP,PKP =38m.11s.
Hungry Horse eS =24m.13s., ePKKP? =30m.7s., ePKP,PKP =37m.58s.
Butte iPS =26m.3s., eSS =30m.41s., eSSS =34m.41s.
Bozeman ipS? =24m.38s., isS? =25m.12s., eSS =30m.24s., eSSS =34m.22s.
New Delhi SKS$_2$N =23m.59s., iPSN =25m.32s., PPSN =26m.17s., sSN =26m.42s., SSN =30m.40s., SSPN =30m.55s., SSSN =34m.45s., QN =39m.44s.
Poona SKSE =23m.38s., sSE =27m.1s.
Tacubaya esPP =18m.24s., eSP =25m.46s.
Bombay SKSE =23m.53s., PPSE =27m.17s., SSE =31m.48s., SSSE =35m.33s., QE =41m.30s.
Puebla e =24m.59s. and 26m.35s.
Rapid City iSKS =23m.56s., esSE =25m.58s., ePSE =27m.17s., eSSE =32m.33s., eSSS?E =35m.16s., ePKP,PKPE =37m.53s.
Almata ePP =18m.2s., PPP =21m.44s.
Rybach'e iSKS =24m.2s., sS =26m.6s.
Vera Cruz i =19m.38s., ipS =25m.53s., esPS =27m.35s., ePKKP =29m.44s.
Frunse PP =17m.51s.
Andijan ePP =17m.52s., iSKS =24m.12s.
Fergana ePP =18m.4s., S =25m.26s.?.
Lincoln eSKSE =24m.16s., ePSE =27m.38s., eSSE =33m.10s.
Stalinabad SKS =24m.25s., PS =27m.30s., SS =33m.0s.
Tashkent iPP =18m.21s., iPS =27m.29s.
Resolute Bay eP =15m.47s., eNZ =16m.27s., eZ =16m.48s., eEN =18m.56s. and 19m.29s., eSEN =23m.27s., eEN =25m.13s., eE =25m.39s., eEN =26m.6s., e =29m.26s., eZ =33m.37s.
Merida eSPP =28m.26s., esSS =34m.39s.
Florissant iS =26m.12s.
St. Louis e =17m. 32s., 18m. 25s., and 18m.30s.

Continued on next page.

Tananarive PPS =29m.24s., SS =34m.22s., e =34m.27s., SSS =38m.30s., e =38m.38s., Q =47m.4s.
Chicago isS? =27m.30s., ePS =28m.26s., isPS =29m.6s., eSS =34m.26s., eSSS =39m.22s.
Sverdlovsk iSKKS =25m.47s., S =26m.37s., PS =28m.19s.
Huancayo epPP? =19m.49s., eSKKS? =25m.48s., i =28m.41s., e =32m.0s., eSS = 34m.42s.
Cincinnati ipPP? =19m.53s.
La Plata E =20m.6s., PSN =29m.55s., SSN =35m.12s., SSE =35m.18s., SSSN = 39m.42s., QN =46m.42s.
Cleveland iPPE =19m.28s., eS?N =27m.9s., isSKKS =27m.18s., isSN =28m.12s., ePSE =29m.7s., eE =29m.26s., epPSE =29m.50s., eE =30m.2s., eN =35m.29s., eSS?N =36m.12s.
Columbia ePS =29m.16s., esPS =29m.54s., eSS =35m.18s., isSS =36m.21s., iSSS = 40m.2s.
La Paz iPKS =20m.24s., iSKKS =26m.12s., PS =29m.24s., i =29m.54s., PPS =30m.44s., iSS =35m.44s., SSS =40m.4s.
Pittsburgh reading has been increased by 10 minutes.
New Kensington iPS?E =29m.58s.
Chinchina eSKP =20m.33s., eSKKS =28m.28s., eSEN =29m.28s., ePS =30m.15s., eSSEN =35m.51s.
Buffalo pPP? =20m.13s., SP =29m.20s.
Pennsylvania iE =19m.43s., eE =20m.17s. and 21m.28s., iPPPE =22m.34s., iE = 26m.20s., iEN =27m.34s. and 28m.34s., ipSP?EN =30m.16s., eN =33m.32s., iN =35m.29s., eN =36m.53s.
Bogota iSKP =20m.40s., ePS =29m.35s.
Washington iZ =18m.44s., 18m.51s., and 33m.35s., eSSZ =36m.34s.
Ottawa PPPZ =21m.56s., e =27m.44s., PS =28m.30s., e =32m.20s., SS =35m.54s.
Philadelphia ePPP =23m.46s., i =25m.7s., isS? =28m.58s., ePS =30m.39s., eSS = 36m.23s., isSS =37m.7s., iSSS? =40m.31s.
Palisades eSKKS =26m.31s., i =29m.1s., ePS =30m.8s., eSS =36m.28s.
Fordham i =38m.28s.
Seven Falls SKKS =26m.34s., e =28m.1s., PS =29m.52s., PPS =30m.49s., SS =37m.46s., SSS =41m.14s.
Harvard isPP =21m.23s., ePPP =23m.0s., esS? =29m.8s., iSS =37m.2s., isSS =37m.52s., eSSS =40m.56s.
Moscow SKKS =27m.15s.
Scoresby Sund i =20m.56s., 21m.25s., and 27m.21s., i =36m.41s. and 38m.18s.
Helsinki ePPSE =32m.19s., eSSN =37m.48s., eSSSN =42m.36s. and other e readings.
Ivigtut 23m.5s. and 31m.47s.
San Juan isPP =21m.52s., iPKS =22m.8s., ipPKS =22m.38s., eS =28m.38s., iPS = 31m.33s., ePPS =32m.52s., iSS =38m.59s.
Upsala ePPN =21m.7s., epPPN =21m.59s., isPP =22m.15s., isPKS =23m.15s., ePPP? = 24m.18s., epPPPE =24m.47s., eSKSPE =30m.42s., eSS?E =39m.0s. and other unidentified readings.
Reykjavik iZ =19m.55s.
Copenhagen 22m.16s., 22m.33s., 23m.11s., and 31m.36s
Istanbul ePKSNZ =22m.56s., ePPPN =25m.16s., ePSN =32m.37s. and other unidentified e readings.
Bucharest eN =19m.27s., iE =22m.41s.
Skalnate Pleso eSKP =22m.24s., ePKS =22m.40s., esPP? =23m.16s., epSKP =23m.34s., epSKS =27m.7s., eSKKS? =28m.16s., eSKSP =31m.41s., ePS =32m.46s., eSS = 39m.48s., eSSS? =44m.46s. and many other unidentified e readings.
Helwan eZ =19m.39s. and 20m.30s., ipPPZ =22m.27s., eZ =23m.32s., eN =40m.51s. and 41m.36s.
Raciborzu e =19m.23s., eN =22m.24s., eZ =22m.31s. and 23m.49s., ePPPNZ =24m.47s., eE =25m.21s., eZ =27m.12s., ePSEN =32m.24s.
Aberdeen iE =19m.48s., iPPPE =25m.29s., iPPSE =34m.13s., iSSE =39m.57s., iE = 40m.42s., eE =55m.57s.
Potsdam ePKPN =19m.12s., iPPE =22m.8s., iSKPN =22m.44s., ipSKPEN =23m.23s.?, iE =24m.9s., eN =29m.25s.
Timisoara iPE =19m.13s.
Budapest PSN =31m.34s., PPSE =35m.17s., SSE =39m.39s., SSPN =40m.24s.?, and other unidentified readings.
Collnberg eZ =20m.31s. and 22m.2s., ePPE =22m.7s., eSKP?Z =22m.31s., eE = 23m.40s., eZ =30m.44s., eE =42m.54s.
Ogyalla esPKPE =20m.18s., eSKP =22m.34s., epPP =23m.24s., esSKP =24m.1s., eSP? =32m.23s. and other unidentified e readings.
Prague esPKP =20m.16s., ePP =22m.21s., iSKPZ =22m.34s., ipPP =23m.11s., isPP = 23m.21s., ePPP? =25m.31s., isSKS =27m.32s., eSKKSE =28m.13s., ePS = 32m.48s., eSSS =40m.18s., esSS?E =42m.39s. and other unidentified readings.
Belgrade eZ =20m.8s., iNE =23m.27s., eNE =35m.41s. and 41m.34s., eNW =43m.21s.
Jena ePKP?N =19m.15s., eEN =19m.32s., eN =19m.36s., ePP?N =22m.7s., eN = 22m.27s., eZ =22m.32s., eE =22m.39s., epPP?N =23m.3s., eE =23m.37s., eN = 23m.40s.
Durham iEN =22m.49s., iN =23m.15s.
Cheb esPKPN =20m.16s., ePP =22m.21s., ePKS =22m.52s., esPP =23m.40s., epSKS?N =27m.14s., ePSKSN =32m.24s., esPS =34m.12s., eSS =40m.48s. and other unidentified e readings.

Continued on next page.

Sonneberg ePKP?N =19m.15s., eE =22m.44s., eN =22m.51s., eE =23m.9s., eN = 23m.12s.
Athens i =19m.14s.
De Bilt iZ =19m.14s., iPP =22m.12s., ipPP =22m.39s., eSSS =44m.54s.
Rathfarnham Castle eZ =20m.50s., 21m.22s., and 22m.46s.
Stuttgart iPP =22m.24s., iSKP =22m.47s. and 23m.2s., eSKKS? =29m.43s., esPS? = 34m.24s., eSS? =40m.42s., eSSS =46m.30s. and other unidentified readings.
Triest esSKKS =29m.13s., ePSKS =32m.30s., iPPS =34m.6s., iSS =40m.11s., iPSS = 40m.50s.
Strasbourg isPKP = 20m.8s., iPP =22m.21s., ipPP =23m.3s., iPPP =25m.20s., eSS = 41m.20s. and other unidentified readings.
Salo eN =19m.20s., iZ =19m.25s., eN =29m.21s.
Paris isPKP =20m.14s., iSKP =22m.36s., iPP? =22m.43s., iPKS =23m.3s., ipPP = 23m.21s., iPPP =26m.10s., iSP =33m.2s., iPS =33m.32s., iSPP =34m.46s., iPSS = 42m.12s., iSSS? =45m.52s. and other unidentified i readings.
Florence eSKP =22m.54s.
Pavia iE =20m.27s. and 21m.8s., iZ =21m.25s., e =29m.17s. and 33m.32s., eSS = 40m.30s., e =47m.36s.
Rome ePPS? =35m.3s.
Messina iZ =19m.44s. and 20m.8s., eE =21m.20s., e =38m.38s. and 42m.36s.
Clermont-Ferrand i =20m.39s., 21m.1s., 21m.15s., 21m.39s., 23m.35s., and 23m.59s., e =30m.6s. and 31m.6s.
Tortosa SKP?N =22m.53s., PPEN =23m.23s., SKKS?E =34m.22s., PPS?N =37m.6s., SSEN =42m.41s., SSSE =48m.37s.
Algiers Univ. ePKP$_2$Z =19m.59s., epPKP$_2$Z =20m.41s., iZ =20m.56s. and 21m.43s.
Toledo i =19m.45s. and 19m.58s., e =52m.13s. and 53m.34s.
Alicante PP =23m.47s., PPP =26m.52s., PPS =35m.44s., SS =41m.32s., SSP =42m.44s., Q =60m.54s.
Almeria PPP =27m.26s., PPS =37m.6s.
Granada iPP =23m.54s., pPP =24m.43s., PPP =27m.9s., SKKS =29m.57s., SKSP = 34m.0s., sSKSP =35m.45s., PPS =38m.21s., iSS =43m.21s., sSS =44m.27s., SSP = 45m.39s., SSS =49m.57s., sSSS =51m.15s.
Malaga iPP =23m.51s., PPP =27m.31s., SKKS =30m.51s.
Tamanrasset ePKP$_2$?Z =20m.30s., epPKP$_2$Z =21m.5s., iPPZ =24m.17s., epPPZ = 24m.53s., eZ =33m.3s.
Averroes iPKP$_2$ =20m.37s., ipPKP$_2$ =21m.13s., i =21m.36s.

March 10d. 22h. 3m. 37s. Epicentre 41°·2N. 142°·5E. Depth of focus 0·010.
(as on 1951, Feb. 27d.).

Intensity V at Hatinohe, Obihiro, Morioka, Furano, Honbetsu, Semmaya, Hizume; IV at Urakawa, Aomori, Miyako, Kusiro, Meguro, Misono, Kikonai, Horomui, Matsuo, Sakari; II-III at Muroran, Sapporo, Nemuro, Hakodate, Mori, Onakayama, Shikotsuko, and Shimamatsu. Epicentre 41°·5N. 142°·3E. Depth 80km.

Seismo. Bull. Cent. Met. Obs., Japan, March, 1951, Tokyo, 1951, p.65, with macroseismic chart.

$A = -\cdot5987$, $B = +\cdot4594$, $C = +\cdot6561$; $\delta = -4$; $h = -2$;
$D = +\cdot609$, $E = +\cdot793$; $G = -\cdot521$, $H = +\cdot399$, $K = -\cdot755$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Hatinohe	1·0	228	0 17	− 3	0 32	− 4	—	—	—
Urakawa	1·0	13	0 16a	− 4	0 29	− 7	—	—	—
Aomori	1·4	254	0 22k	− 3	0 38	− 6	—	—	—
Miyako	1·6	194	0 28	0	0 49	0	—	—	—
Muroran	1·6	315	0 19k	− 9	0 33	−16	—	—	—
Morioka	1·8	214	0 31	+ 1	0 53	0	—	—	—
Obihiro	1·8	17	0 28a	− 2	0 48	− 5	—	—	—
Sapporo	2·1	335	0 27k	− 7	—	—	—	—	—
Kusiro	2·3	38	0 30	− 7	0 55	−10	—	—	—
Mizusawa	2·3	207	0 39	+ 2	1 7	+ 2	—	—	—
Suttsu	2·3	313	0 31	− 6	0 55	−10	—	—	—
Akita	2·4	231	0 37k	− 1	1 11	+ 4	—	—	—
Isinomaki	2·9	198	0 46	+ 1	—	—	—	—	—
Abasiri	3·1	25	0 49	+ 1	1 20	− 4	—	—	—
Nemuro	3·1	47	0 47	− 1	1 23	− 1	—	—	—
Sakata	3·1	221	0 55	+ 7	—	—	—	—	—
Sendai	3·2	203	0 49k	− 1	1 27	0	—	—	—
Yamagata	3·4	210	0 45	− 7	—	—	—	—	—
Hukusima	3·8	206	0 59	+ 1	1 44	+ 2	—	—	—
Inawashiro	4·1	208	1 5	+ 3	1 59	+10	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Niigata		4·2	220	1 28	+25	—	—	—	—	—
Wakkanai		4·2	352	1 1	− 2	1 39	−12	—	—	—
Onahama		4·4	197	1 9	+ 3	2 10	+14	—	—	—
Shirakawa		4·4	204	1 12	+ 6	2 9	+13	—	—	—
Aikawa		4·6	228	1 8	− 1	2 13	+12	—	—	—
Mito		5·1	199	1 19	+ 3	2 24	+10	—	—	—
Utunomiya		5·1	205	1 15	− 1	2 22	+ 8	—	—	—
Takada		5·3	220	1 18	0	2 24	+ 6	—	—	—
Tukubasan		5·4	203	1 18	− 2	2 28	+ 7	—	—	—
Maebasi		5·5	210	1 25	+ 4	2 32	+ 9	—	—	—
Kumagaya		5·6	207	1 28	+ 6	2 34	+ 8	—	—	—
Nagano		5·6	218	1 28	+ 6	2 25	− 1	—	—	—
Tyosi		5·6	194	1 25	+ 3	2 23	− 3	—	—	—
Matusiro		5·7	217	1 25	+ 1	2 34	+ 6	—	—	—
Oiwake		5·7	214	1 26	+ 2	2 41	+13	—	—	—
Wazima		5·8	230	1 25a	0	—	—	—	—	—
Titibu		5·9	208	1 33	+ 7	2 54	+21	—	—	—
Tokyo		5·9	202	1 30	+ 4	2 37	+ 4	—	—	—
Matumoto		6·1	217	1 33	+ 4	2 49	+11	—	—	—
Toyama		6·1	224	1 30	+ 1	3 10	+32	—	—	—
Yokohama		6·2	202	1 40	+10	3 5	+24	—	—	—
Kohu		6·3	210	1 47	+15	2 59	+16	—	—	—
Hunatu		6·4	208	1 39	+ 6	3 0	+14	—	—	—
Kanazawa		6·5	226	1 39	+ 4	3 7	+19	—	—	—
Takayama		6·5	221	1 25	−10	—	—	—	—	—
Misima		6·7	206	1 49	+12	3 7	+14	—	—	—
Iida		6·8	214	1 44	+ 5	2 57	+ 2	—	—	—
Shizuoka		7·0	209	1 51	+ 9	3 13	+13	—	—	—
Hukui		7·1	226	1 41	− 2	—	—	—	—	—
Gihu		7·4	220	1 51	+ 4	3 15	+ 5	—	—	—
Nagoya		7·4	218	1 55	+ 8	3 24	+14	—	—	—
Omaesaki		7·4	209	2 16	+29	3 38	+28	—	—	—
Hamamatu		7·5	212	2 10	+22	3 23	+11	—	—	—
Tsuruga		7·5	224	1 51	+ 3	—	—	—	—	—
Hikone		7·7	222	1 53	+ 2	—	—	—	—	—
Kameyama		7·9	219	2 3	+ 9	3 22	0	—	—	—
Tu		8·0	218	2 1	+ 6	4 4	+39	—	—	—
Kyoto		8·2	223	1 59	+ 1	3 37	+ 7	—	—	—
Kashiwara		8·5	221	2 24	+22	—	—	—	—	—
Osaka		8·5	222	2 10	+ 8	—	—	—	—	—
Kobe		8·7	224	2 11	+ 6	—	—	—	—	—
Owase		8·7	217	2 9	+ 4	4 8	+26	—	—	—
Sumoto		9·1	224	2 21	+11	3 41	−11	—	—	—
Takamatu		9·6	227	2 43k	+26	—	—	—	—	—
Hamada		10·4	236	2 28	0	—	—	—	—	—
Koti		10·4	226	2 26	− 2	—	—	—	—	—
Matuyama		10·7	230	2 33	+ 1	—	—	—	—	—
Torisima		10·9	194	2 59	+25	—	—	—	—	—
Simidu		11·3	225	2 53	+13	—	—	—	—	—
Ooita		11·7	231	2 53	+ 8	—	—	—	—	—
Hukuoka		12·3	235	2 52a	− 1	—	—	—	—	—
Saga		12·5	235	3 21	+25	—	—	—	—	—
Kumamoto		12·6	232	2 53	− 4	—	—	—	—	—
Manila		32·5	222	(e 6 23)	0	i 10 33	−57	e 11 13	sS	—
College		45·2	35	i 8 23	pP	i 14 43	+ 2	—	—	—
Shasta Dam		68·0	55	i 11 01	pP	—	—	—	—	—
Scoresby Sund	z.	68·1	355	i 10 52k	+ 1	—	—	—	—	—
Hungry Horse		68·2	45	i 11 4	pP	—	—	—	—	—
Mineral	z.	68·7	55	e 11 4k	+ 9	—	—	—	—	—
Berkeley	z.	69·7	57	e 11 21	pP	—	—	—	—	—
Reno	z.	70·3	54	e 11 27	pP	e 20 43	sS	—	—	—
Tinemaha	z.	72·7	55	i 11 43	pP	—	—	—	—	—
Haiwee	z.	73·5	56	i 11 45	pP	—	—	—	—	—
Pasadena		74·6	58	i 11 50	pP	e 22 8	sS	—	—	—
Riverside	z.	75·2	58	i 11 50	pP	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Boulder City		75·6	55	i 11 41	+ 5	—	—	—	—	—
Palomar	Z.	76·0	57	i 11 56	pP	—	—	—	—	—
Skalnate Pleso		76·6	325	e 11 39	− 3	—	—	—	—	—
Raciborzu		76·8	327	e 11 45	+ 2	—	—	—	—	—
Collmberg	Z.	77·9	330	e 11 49	0	—	—	—	—	e 44·3
Istanbul	Z.	78·3	315	e 11 28	−23	e 21 21	−16	e 11 54	pP	—
Prague		78·4	329	i 11 51	− 1	e 21 23	−15	e 12 11	pP	—
Budapest	N.	78·5	325	e 12 9	pP	—	—	—	—	—
Jena		78·7	330	e 11 53	0	—	—	e 12 14	pP	—
Vienna		79·0	327	e 11 56	+ 1	—	—	—	—	—
Cheb		79·1	331	e 11 54	− 1	e 21 37	− 8	e 15 54	PP	—
Kalossa	E.	79·2	324	e 12 5	+ 9	—	—	—	—	—
Ksara		79·4	306	i 11 59	+ 2	—	—	—	—	—
Belgrade	Z.	79·9	322	e 12 2a	+ 2	—	—	—	—	—
Tucson		80·5	55	i 12 26	pP	—	—	—	—	—
Stuttgart	Z.	81·4	331	e 12 7	− 1	—	—	e 12 32	pP	—
Karlsruhe	Z.	81·5	332	e 12 8	0	—	—	—	—	—
Rathfarnham C.	Z.	82·1	342	i 12 13	+ 2	—	—	i 12 31	pP	—
Strasbourg		82·1	332	e 12 7	− 4	—	—	i 12 39	pP	—
Triest	Z.	82·2	327	e 12 18	+ 6	—	—	—	—	—
Zürich		82·8	331	e 12 16	+ 1	—	—	—	—	—
Chur		82·9	330	e 12 17	+ 2	—	—	—	—	—
Basle		83·0	331	e 12 16	0	—	—	—	—	—
Paris		83·7	335	e 12 20	+ 1	—	—	e 12 41	pP	—
Besançon		83·8	332	e 12 20	0	—	—	e 12 36	pP	—
Clermont-Ferrand		86·1	333	i 12 4	−27	—	—	i 12 51	pP	—

Additional readings and note :—
Manila P has been increased by 2m.
Prague isP =12m.21s., ePS? =22m.17s.
Budapest PKPE =12m.12s.
Cheb ePS?N =22m.13s., e =22m.50s., eSSS =30m.23s.
Strasbourg eP =12m.12s.

March 10d. Readings also at 1h. (Apia), 6h. (Hungry Horse, near Tacubaya, near Bogota, and near Chatra), 7h. (near Alicante, near Sofia, and near Tacubaya), 9h. (near Bogota, Chinchina, and near Balboa Heights), 10h. (Almeria, near Granada (4), near Tortosa, and near Santa Clara), 11h. (Manila, Ashkabad, near Andijan, Malaga, near Alicante, Almeria (2), Granada, Toledo, Tortosa, and near Tananarive), 12h. (Brisbane, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Overton, Pierce Ferry, Reno, Hungry Horse, College, Merida, Tacubaya, San Juan, Tamanrasset, Tortosa, Almeria, Malaga (5), and near Granada (4)), 13h. (Malaga (2)), 14h. (Manila, Tamanrasset, Almeria (2), Tortosa, Malaga (2), near Alicante (3), Granada (3), La Paz, and near Huancayo), 15h. (Almeria, Malaga, Granada (2), Tortosa, College (3), China Lake, Perris, Shasta Dam, near Pasadena, Riverside, Boulder City, Overton, Pierce Ferry, and near Prague), 17h. (Fergana, Mary, near Andijan, Kulyab, Stalinabad, Almeria, Granada, Malaga (2), near Alicante, and near Manila), 18h. (Granada, Malaga, College (2), and near Manila), 19h. (Manila and near Kurmenty), 20h. (near Shasta Dam), 23h. (Brisbane, College, Malaga, near Ashkabad, near Athens, and near Huancayo).

March 11d. 9h. Peru, probably deep.

La Paz iPZ =9m.8s.k, iS =9m.46s., i =9m.56s.
Huancayo iP =9m.34s., iS =10m.23s., eL =10m.55s.
Bogota iP =12m.25s.
Chinchina iPZ =12m.32s., eSZ =16m.14s.
San Juan iP =14m.33s.
Morgantown iP =17m.26s.
Weston iP =17m.41s.
Tucson eP =18m.10s.
Riverside ePZ =18m.42s.
Mount Wilson ePZ =18m.45s.
Overton iPZ =18m.46s.
China Lake ePZ =18m.51s.
Tinemaha ePZ =18m.59s.
Hungry Horse iP =19m.31s., i =20m.18s.
Tamanrasset ePZ =20m.23s., epPZ =21m.12s.
College eP =21m.30s.

March 11d. 12h. 16m. 0s. Epicentre 33°·8N. 134°·2E. (as on 1947, Aug. 25d.).

Intensity IV at Sumoto, Siomisaki, Tokusima, and Hatukaiti; II-III at Muroto, Takamatsu, Kôti, Wakayama, Matuyama, Habu, and Otake.
Epicentre 33°·8N. 134°·3E. Depth 10km.

Seismological Bulletin of the C.M.O., Japan, for March, 1951, Tokyo, 1951, p.66, with macroseismic chart.

$A = -·5805$, $B = +·5970$, $C = +·5537$; $\delta = -3$; $h = +1$;
$D = +·717$, $E = +·697$; $G = -·386$, $H = +·397$, $K = -·833$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Tokusima	0·4	50	0 32	+19	—	—
Takamatsu	0·5	348	0 12a	− 2	0 20	− 3
Kôti	0·6	246	0 12k	− 3	0 21	− 5
Muroto	0·6	181	0 10a	− 5	0 17	− 9
Himeji	0·7	13	0 22	+ 5	0 36	+ 8
Sumoto	0·8	46	0 16k	− 2	0 26	− 5
Wakayama	0·9	62	0 16	− 4	0 28	− 6
Kobe	1·2	43	0 24k	0	0 41	0
Matuyama	1·2	272	0 23k	− 1	0 40	− 1
Osaka	1·4	52	0 28k	+ 1	0 46	0
Simidu	1·4	225	0 30	+ 3	0 48	+ 2
Siomisaki	1·4	105	0 26k	− 1	0 42	− 4
Kashiwara	1·5	61	0 59	+31	—	—
Uwazima	1·5	248	0 24	− 4	0 44	− 5
Owase	1·7	81	0 30	− 1	0 52	− 2
Tottori	1·7	1	0 30	− 1	0 47	− 7
Kyoto	1·8	46	0 32	0	0 54	− 2
Toyooka	1·8	16	0 34	+ 2	0 55	− 1
Yonago	1·8	337	0 33	+ 1	—	—
Hamada	2·1	302	0 39	+ 2	1 6	+ 2
Tu	2·1	64	0 33	− 4	1 7	+ 3
Hikone	2·2	49	0 39	+ 1	1 11	S_g
Kameyama	2·2	61	0 40	+ 2	1 14	S_g
Ooita	2·2	255	0 40	+ 2	—	—
Tsuruga	2·4	39	0 41	0	1 14	+ 2
Saigo	2·5	344	0 56	P_g	1 26	S_g
Simonoseki	2·6	273	0 51	P_g	1 27	S_g
Gihu	2·7	53	0 44	− 1	1 24	S*
Nagoya	2·7	59	0 45	0	1 19	0
Hukui	2·8	37	0 54	P_g	1 31	S_g
Miyazaki	3·0	231	1 2k	P_g	1 35	S_g
Hamamatu	3·1	73	0 54	+ 3	1 28	− 2
Kumamoto	3·1	251	0 59	P_g	1 43	S_g
Hukuoka	3·2	266	1 0k	P*	1 43	S_g
Saga	3·3	262	1 4	P_g	2 6	?
Kanazawa	3·4	36	1 6	P_g	1 45	S*
Omaesaki	3·4	75	1 7	P_g	2 5	?
Takayama	3·4	46	0 57	+ 2	1 46	S*
Unzendake	3·5	253	1 7	P_g	1 57	S_g
Shizuoka	3·6	70	1 11	P_g	1 52	S*
Nagasaki	3·8	255	1 8	P*	2 2	S_g
Toyama	3·8	39	1 10	P*	2 2	S_g
Matumoto	3·9	51	1 11	P*	2 6	S_g
Hunatu	4·1	64	1 5	0	2 1	+ 6
Ituhara	4·1	273	1 19	P_g	2 6	S*
Kohu	4·1	62	1 16	P*	2 17	S_g
Misima	4·1	70	1 22	P_g	—	—
Wazima	4·2	31	1 12	P*	2 13	S*
Nagano	4·4	48	1 27	P_g	—	—
Oiwake	4·4	53	1 16	P*	2 22	S_g
Titibu	4·6	60	1 30	P_g	2 36	S_g
Takada	4·7	43	1 42	P_g	2 33	S_g
Tomie	4·7	257	1 30	P_g	2 33	S_g
Maebasi	4·8	55	1 16	+ 1	—	—
Mera	4·8	75	1 56	?	—	—

Continued on next page.

	△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.
Yokohama	4·8	68	1 34	P_g	—	—
Kumagaya	4·9	59	1 29	P*	2 26	S*
Tokyo	4·9	66	1 34	P_g	—	—
Utunomiya	5·4	58	1 32	P*	2 56	S_g
Niigata	5·7	42	2 32	S	(2 32)	− 3
Mito	5·8	61	1 42	P*	3 5	S_g
Inawasiro	6·1	50	1 48	P*	—	—
Sendai	7·0	49	2 52	?	—	—
College	54·9	31	e 9 35	0	—	—
Hungry Horse	78·1	39	e 12 1	− 1	—	—

March 11d. Readings also at 0h. (Granada and near Khorog), 2h. (Granada, Malaga, Almeria, near Chinchina, and Bogota), 3h. (Tucson, Vera Cruz, Tacubaya, Puebla, and near Merida), 4h. (near Fort de France), 6h. (College), 8h. (Bogota), 10h. (Tacubaya), 11h. (near Athens, near Almata II, Kurmenty, Chilisk, and Ili), 12h (near Klyuchi), 13h. (Toledo, Malaga, Almeria, Granada (4), and near Alicante), 14h. (Pavia, Mizusawa, Manila, La Paz, La Plata, Boulder City, Overton, Kurmenty, Almata, Frunse, near Almata II, Ili, Krasnogorka, and Naryn), 15h. (Paris), 16h. (Ashkabad, China Lake, Tucson, Samarkand, near Khorog, Kulyab, and Stalinabed), 17h. (near Khorog), 18h. (Hungry Horse, Tucson, and near Boulder City), 20h. (Manila and near Khorog), 21h. (Lenkoran), 22h. (Istanbul, near Sofia, Almata II, and near Kurmenty).

March 12d. 8h. 56m. 32s. Epicentre 42°·0N. 31°·8E.

Epicentre given by Strasbourg.

A = +·6335, B = +·3928, C = +·6666; δ = −3; h = −2;
D = +·527, E = −·850; G = +·567, H = +·351, K = −·745.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Istanbul		2·3	246	i 0 42	+ 2	i 1 11	+ 2	—	—	—
Yalta		3·0	34	i 0 52	+ 2	1 28	+ 1	0 55	P*	—
Theodosia		4·0	40	1 4	0	1 50	− 2	—	—	—
Bucharest		4·8	302	e 1 22	P*	i 2 20	+ 8	i 1 32	P_g	—
Kishinev		5·4	338	1 28	+ 4	i 2 29	+ 1	—	—	—
Sotchi		6·0	72	e 1 33	+ 1	2 28	−15	—	—	—
Sofia	E.	6·3	279	e 1 55	P*	e 3 0	+10	—	—	—
Timisoara	E.	8·5	300	—	—	e 3 57	+12	—	—	—
Belgrade		8·7	293	e 2 11a	+ 1	e 3 52	+ 2	e 4 45	S_g	e 6·6
Ksara		8·8	157	i 2 16	+ 5	i 4 48	S_g	—	—	—
Gori		9·2	86	—	—	e 4 2	− 1	—	—	—
Uzhgorod		9·4	318	e 2 22	+ 4	e 3 52	−15	e 4 45	S*	—
Lwow		9·5	328	e 2 22?	+ 2	e 4 6	− 4	—	—	—
Tiflis		9·7	87	e 2 26	+ 4	e 4 15	0	—	—	—
Kirovobad		11·0	92	e 2 40	− 2	—	—	—	—	—
Moscow		14·3	14	e 3 23	− 3	—	—	—	—	—
Pavia		16·7	289	—	—	e 6 28	?	—	—	e 8·5
Stuttgart		17·2	302	e 4 4?	+ 1	e 7 40	SS	e 4 17	PP	e 11·3
Pulkovo		17·8	358	4 7	− 4	—	—	—	—	—
Strasbourg		18·1	301	e 4 20	+ 6	—	—	e 4 44	PP	e 10·7
Copenhagen		18·6	325	i 4 24	+ 3	—	—	—	—	9·5
Besançon		19·1	296	e 4 29	+ 2	—	—	e 4 40	PP	—
Ashkabad		20·7	92	e 4 41	− 3	—	—	—	—	—
Paris		21·8	299	e 4 54	− 2	e 9 26	SS	e 12 26	PcS	e 13·5
Sverdlovsk		23·7	41	i 5 13	− 1	9 33	+ 6	—	—	—
Tashkent		27·9	78	—	—	e 10 32	− 5	—	—	—
Tamanrasset	Z.	29·1	238	e 6 3	− 1	—	—	e 6 56	PP	—
College		73·5	0	e 11 35	− 1	—	—	e 11 49	PcP	—
Hungry Horse		85·1	338	e 12 39	0	—	—	—	—	—

Additional readings :—
Yalta S* = 1m.25s.
Bucharest iP_gN = 1m.44s., iE = 2m.12s., iN = 2m.25s., iS_gN = 2m.45s.
Belgrade eNW = 4m.34s., eS_gNW = 5m.5s., eNW = 5m.53s., eNE = 6m.2s.
Stuttgart ePZ = 4m.7s., eZ = 4m.57s.
Strasbourg e = 5m.7s. and 5m.54s.
Paris e = 5m.14s.
Long waves were also recorded at Budapest, De Bilt, and Helsinki.

March 12d. 14h. 52m. 20s. Epicentre 28°·7N. 94°·2E. (as on Feb. 21d.).

Intensity VII at Mohanbari and Dibrugarh. Epicentre 28°·2N. 94°·0E. (Poona).

Seismological Bulletin, Government of India Meteorological Department, March, 1951, p.17.

$A = -\cdot0643$, $B = +\cdot8762$, $C = +\cdot4777$; $\delta = +6$; $h = +2$;
$D = +\cdot997$, $E = +\cdot073$; $G = -\cdot035$, $H = +\cdot476$, $K = -\cdot879$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		6·5	255	i 1 42	+ 3	i 3 1	+ 6	2 16	P_g	3·1
Calcutta	E.	8·1	222	e 1 53	− 9	i 3 23	−12	i 4 14	S_g	—
Dehra Dun	N.	14·1	281	(e 3 28?)	+ 5	(e 5 58?)	− 4	—	—	—
New Delhi		14·9	274	e 3 33	− 1	e 6 19	− 1	6 31	SS	6·2
Hyderabad		18·3	236	i 4 10	− 7	i 7 40	+ 1	—	—	9·8
Kurmenty		19·2	322	i 4 33	+ 5	—	—	—	—	—
Naryn		19·5	316	i 4 37	+ 6	i 8 25	+19	—	—	—
Almata II		19·9	322	i 4 41	+ 5	—	—	—	—	—
Almata		20·1	322	i 4 45	+ 7	i 8 32	+13	—	—	—
Rybach'e		20·1	320	i 4 42	+ 4	8 35	+16	—	—	—
Ili		20·4	323	i 4 46	+ 5	—	—	—	—	—
Khorog		20·8	300	i 4 50	+ 5	8 48	+15	—	—	—
Poona		21·2	246	i 4 48	− 1	i 8 38	− 3	5 15	PP	9·8
Frunse		21·2	316	i 4 55?	+ 6	i 9 1?	+20	—	—	—
Andijan		21·5	309	i 4 58	+ 6	i 9 1	+14	—	—	—
Nanking		21·5	74	i 4 45k	− 7	i 8 40	− 7	i 5 19	PP	i 9·6
Bombay	E.	21·8	248	e 4 54	− 2	i 8 55	+ 3	5 40	PPP	9·3
Fergana		21·8	309	i 4 59	+ 3	—	—	—	—	—
Kulyab		22·3	300	e 5 2	+ 1	e 9 12	+10	—	—	—
Stalinabad		23·3	303	i 5 14	+ 4	i 9 32	+12	—	—	—
Zi-ka-wei	E.	23·7	76	e 5 9	− 5	9 23	− 4	—	—	—
Tashkent		23·9	308	i 5 21?	+ 5	i 9 46?	+16	—	—	—
Kodaikanal	E.	24·1	225	i 5 13	− 5	i 9 34	0	10 14	SS	11·6
Semipalatinsk		24·1	339	e 5 24	+ 6	—	—	—	—	—
Tchimkent		24·1	311	i 5 22	+ 4	—	—	—	—	—
Irkutsk		24·7	13	5 28	+ 4	9 55	+11	—	—	—
Samarkand		24·9	303	i 5 30	+ 4	—	—	—	—	—
Kabansk		25·1	16	i 5 30	+ 2	—	—	—	—	—
Colombo	E.	25·6	216	5 27	− 5	9 56	− 3	—	—	—
Manila		28·5	113	e 5 40?	−19	—	—	—	—	—
Ashkabad		31·2	297	i 6 30	+ 7	11 39	+10	—	—	—
Vladivostok		33·5	54	i 6 38	− 5	i 11 59	− 6	—	—	—
Djakarta		36·7	158	i 6 57	−13	e 12 48	− 6	—	—	—
Sverdlovsk		36·7	330	i 7 15	+ 5	13 2	+ 8	—	—	—
Bandong		37·7	157	e 6 54	−25	e 12 36	−34	—	—	—
Baku		37·9	300	e 7 28?	+ 8	e 13 19?	+ 6	—	—	—
Lenkoran		38·7	298	7 29	+ 2	—	—	—	—	—
Shemakha		38·9	300	7 23	− 6	—	—	—	—	—
Kirovobad		40·7	301	7 48	+ 4	i 14 2	+ 7	—	—	—
Grozny		41·2	304	e 7 53	+ 5	e 14 10	+ 8	—	—	—
Yuzno-Sakhlinsk		41·7	50	7 48	− 4	—	—	—	—	—
Tiflis		41·9	302	e 7 57	+ 3	—	—	—	—	—
Erevan		42·1	299	e 8 3	+ 8	—	—	—	—	—
Gori		42·4	303	e 8 0	+ 2	—	—	—	—	—
Leninakan		42·6	301	e 8 7	+ 8	—	—	—	—	—
Abastumanj		43·3	302	e 8 10	+ 5	—	—	—	—	—
Sotchi		45·6	305	8 26	+ 2	15 13	+ 7	—	—	—
Moscow		48·1	321	i 8 46	+ 3	i 15 47	+ 5	—	—	—
Ksara		49·5	291	i 8 58k	+ 4	16 12	+10	—	—	—
Yalta		49·6	305	8 56	+ 1	16 8	+ 5	—	—	—
Pulkovo		52·6	325	i 9 20	+ 2	i 16 50	+ 6	—	—	—
Kishinev		53·2	310	9 22	0	16 56	+ 4	—	—	—
Istanbul	Z.	53·7	302	i 9 29	+ 3	e 14 30	PcS	—	—	—
Helwan		54·2	288	e 9 22	− 7	17 4	− 2	e 19 10	ScS	—
Lwow		56·2	313	i 9 45	+ 1	e 17 38	+ 5	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Uzhgorod		57·4	312	i 9 54	+ 1	i 17 54	+ 5	—	—	—
Sofia		57·6	305	e 10 8	+14	—	—	—	—	—
Skalnate Pleso		58·7	313	e 10 0	− 2	e 18 9	+ 3	e 12 40	PP	—
Upsala		59·0	326	i 10 3a	− 1	i 18 14	+ 4	e 25 5	Q	e 28·5
Belgrade		59·3	307	e 10 6a	0	e 18 19	+ 5	—	—	e 37·1
Budapest		59·7	311	10 12	+ 3	e 18 26	+ 7	—	—	35·7
Raciborzu		59·8	314	10 13	+ 4	—	—	e 12 18	PP	e 39·7
Kalossa		60·0	310	e 10 16	+ 5	—	—	—	—	e 40·5
Ogyalla	E.	60·2	312	e 11 20	PcP	e 18 22	− 3	e 19 58	ScS	—
Prague		62·2	315	e 10 26k	0	e 18 50	− 1	i 13 1	PP	e 30·7
Copenhagen		62·3	322	i 10 28k	+ 2	i 19 0	+ 8	20 23	ScS	—
Potsdam		62·6	318	i 10 33	+ 5	e 19 1	+ 5	—	—	e 35·7
Collmberg	Z.	62·9	316	e 10 30	0	—	—	e 11 9	PcP	—
Cheb		63·5	315	e 10 37	+ 3	e 18 59	− 8	e 12 52	PP	—
Triest		63·7	310	e 10 34k	− 2	e 19 10	0	e 20 30	ScS	—
Jena		63·8	316	e 10 37	+ 1	e 19 17	+ 6	e 11 7	PcP	e 36·7
Padova		65·3	309	10 50	+ 4	19 38	+ 9	—	—	—
Rome		65·6	306	e 10 46	− 2	e 19 36	+ 3	e 13 17	PP	—
Bologna		65·7	310	e 11 17	PcP	e 21 15	?	—	—	—
Florence		65·9	308	e 10 51	+ 1	—	—	—	—	—
Salo		65·9	311	i 10 52k	+ 2	e 19 40	+ 3	11 2	PcP	—
Stuttgart		65·9	314	i 10 50k	0	e 19 42	+ 5	e 11 9	PcP	e 37·2
Prato		66·0	308	e 10 54	+ 4	e 19 40	+ 2	—	—	—
Chur		66·2	311	e 10 52k	0	e 19 42	+ 2	—	—	—
Karlsruhe	Z.	66·3	314	i 10 53	+ 1	—	—	—	—	—
Zürich		66·7	313	e 10 54k	− 1	e 19 51	+ 5	—	—	—
Strasbourg		66·8	314	i 10 56k	0	e 19 54	+ 6	e 13 28	PP	e 34·7
Pavia		67·0	311	e 11 48	+51	e 19 51	+ 1	—	—	e 31·4
Basle		67·3	313	e 10 59k	0	e 19 25	−29	e 13 27	PP	—
De Bilt		67·3	319	e 11 0	+ 1	e 19 52	− 2	—	—	e 30·7
Neuchatel		67·8	313	e 11 2	0	—	—	—	—	—
Besançon		68·4	313	i 11 5	− 1	—	—	e 11 34	PcP	—
Paris		70·1	316	i 11 14	− 2	i 20 29	+ 2	i 13 52	PP	e 40·7
Kew		70·8	319	i 11 20k	0	e 20 39	+ 4	i 11 42	PcP	e 34·7
Scoresby Sund		71·4	342	i 11 24k	0	e 20 42	0	e 21 30	ScS	—
Algiers Univ.	Z.	74·3	303	e 11 35	− 6	—	—	—	—	—
Tortosa		74·5	308	11 46	+ 4	21 22	+ 5	—	—	46·7
College		75·2	23	i 11 44	− 2	i 21 24	− 1	e 14 35	PP	e 30·7
Resolute Bay		76·7	2	i 11 54	− 1	21 45	+ 4	14 44	PP	—
Tamanrasset	Z.	78·3	290	i 12 3a	0	e 42 27	SKPP′	i 15 2	PP	—
Brisbane		79·4	129	i 12 1a	− 8	e 22 0	−10	—	—	—
Riverview		82·3	134	i 12 20k	− 5	i 22 32	− 8	—	—	—
Pretoria	Z.	83·4	236	i 12 27	− 3	—	—	12 39	PcP	—
Pietermaritzburg	Z.	84·1	231	i 12 10	−24	—	—	—	—	—
Grahamstown	Z.	88·9	231	i 12 53	− 5	—	—	—	—	—
Hungry Horse		99·2	19	i 13 44	− 1	—	—	i 17 49	PP	—
Shasta Dam		103·1	27	e 13 40	−22	—	—	e 18 14	PP	—
Reno	Z.	105·1	26	e 18 27k	[+ 4]	—	—	—	—	—
Logan		105·9	20	e 18 25	[0]	—	—	—	—	—
Fresno	Z.	107·5	28	e 18 42	PP	—	—	—	—	—
Tinemaha	Z.	107·8	27	e 18 37	[+ 8]	—	—	—	—	—
China Lake	Z.	109·2	27	e 17 44	?	—	—	i 19 2	PP	—
Overton	Z.	109·8	24	e 18 8	[−25]	e 26 5	(+ 1)	i 18 53	PP	—
Boulder City		110·1	24	e 19 5	PP	—	—	—	—	—
Pasadena	Z.	110·6	28	i 19 9	PP	—	—	—	—	—
Riverside	Z.	110·9	28	e 19 12	PP	—	—	—	—	—
Palomar	Z.	111·6	27	i 19 17	PP	—	—	—	—	—
Tucson		114·9	23	e 18 43	[0]	—	—	e 19 41	PP	—
La Paz		159·7	304	20 4	[+ 4]	i 24 12	PP	i 20 48	PKP_2	—
Huancayo		160·8	328	e 20 4	[+ 2]	—	—	e 20 51	PKP_2	—

For Notes see next page.

NOTES TO MARCH 12d. 14h. 52m. 20s.

Additional readings and note :—
Chatra PPEZ = 1m.51s., P*EZ = 1m.59s., QN = 2m.39s., SSEZ = 3m.12s., SSSEN = 3m.23s.
Dehra Dun readings have been reduced by 2 minutes.
Poona iE = 4m.52s., PPE = 5m.5s., iE = 5m.37s., 7m.18s., and 8m.44s., QE = 8m.52s., SSE = 9m.13s., SSSE = 9m.23s., S_cPE = 12m.14s., S_cSE = 15m.49s.
Nanking iE = 5m.32s., iSSE = 9m.21s., iSSSN = 9m.30s.
Bombay SSE = 9m.40s.
Skalnate Pleso ePS = 18m.30s., eSS = 22m.40s., eN = 25m.22s.
Upsala eN = 19m.6s.
Belgrade eZ = 11m.31s., eSNE = 18m.22s.
Raciborzu eN = 11m.13s., ePPPZ = 13m.56s.
Ogyalla ePPE = 12m.55s., eE = 19m.0s., e = 21m.57s.
Prague ePPP = 14m.8s., eS = 19m.0s., and numerous unidentified readings.
Cheb ePP?N = 13m.8s., e = 14m.42s., eSE = 18m.55s., ePS? = 19m.25s.
Jena eE = 10m.48s.
Stuttgart e = 12m.13s.
Strasbourg e = 11m.5s., ePcP = 11m.27s., e = 11m.43s., ePPP = 14m.54s., eSKS = 20m.56s., eSSS = 27m.20s.
Besançon e = 11m.18s., 11m.52s., 12m.6s., and 13m.25s., ePPP = 15m.8s.
Paris i = 11m.21s. and 11m.28s., iPcP = 11m.42s., i = 13m.45s., iPPP? = 15m.14s., i = 15m.55s., e = 21m.44s., eSSS = 28m.44s.
Kew eSEN = 19m.5s.
College ePP? = 14m.12s., ePKKP? = 30m.35s.
Resolute Bay eEN = 22m.8s. and 22m.34s.
Tamanrasset ePcPZ = 12m.14s., eZ = 16m.16s., ePPPZ = 16m.45s.
Hungry Horse e = 17m.30s.
China Lake eZ = 18m.46s.
Tucson iPP = 19m.44s.
Long waves were also recorded at Aberdeen, Bergen, Helsinki, Clermont-Ferrand, Alicante, Rathfarnham Castle, and Terre Adèlie.

March 12d. 15h. 45m. 36s. Epicentre 39°·3N. 48°·5E.

Epicentre given by U.S.S.R. network bulletin.

$A = +\cdot5142$, $B = +\cdot5812$, $C = +\cdot6308$; $\delta = +10$; $h = -1$;
$D = +\cdot749$, $E = -\cdot663$; $G = +\cdot418$, $H = +\cdot472$, $K = -\cdot776$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lenkoran		0·6	155	i 0 15	0	—	—	—	—	—
Shemakla		1·3	5	0 35	P_g	—	—	—	—	—
Baku		1·5	45	—	—	i 0 57	S_g	—	—	—
Kirovobad		2·2	312	i 0 46	P_g	i 1 16	S_g	—	—	—
Erevan		3·2	287	e 1 6	P_g	1 52	S_g	—	—	—
Tiflis		3·7	312	e 1 10	P_g	—	—	—	—	i 2·4
Leninakan		3·9	294	—	—	2 3	S*	—	—	—
Gori		4·3	310	e 1 13	P*	—	—	—	—	—
Grozny		4·5	334	—	—	e 2 22	S*	—	—	—
Abastumanj		5·0	301	e 1 33	P*	i 3 4	L	—	—	(i 3·1)
Ashkabad		7·8	96	i 1 52	− 6	i 3 13	−15	—	—	—
Samarkand		14·3	83	e 3 16	−10	—	—	—	—	—
Tchimkent		16·2	73	e 3 46	− 4	—	—	—	—	—
Andijan		18·3	77	i 4 14	− 3	—	—	—	—	—
Naryn		21·0	74	e 4 53	+ 6	—	—	—	—	—
Rybach'e		21·0	71	e 4 49	+ 2	—	—	—	—	—
Ili		21·8	67	i 4 54	− 2	—	—	—	—	—
Almata II		22·0	68	e 4 56	− 2	—	—	—	—	—
Kurmenty		22·7	68	e 5 3	− 1	—	—	—	—	—
Tamanrasset	z.	39·9	258	e 7 37k	0	—	—	—	—	—
College		75·4	7	e 11 48	+ 1	—	—	e 12 6	PcP	—

March 12d. Readings also at 0h. (Strasbourg and Lenkoran), 3h. (near Khorog), 4h. (near Nakhichevan), 6h. (College (2), Hungry Horse (2), Pasadena, Riverside, China Lake, Tinemaha, Overton, Tucson, and near Apia), 8h. (College and Hungry Horse), 9h. (near Istanbul), 10h. (Naryn, Samarkand, Tchimkent, near Khorog, Kulyab, Stalinabad, Fergana, Andijan, and near Mizusawa), 11h. (near Manila), 15h. (Stuttgart, College, and Overton), 17h. (near Messina), 18h. (Istanbul), 19h. (near Istanbul), 22h. (Manila), 23h. (near Messina).

March 13d. 0h. 21m. 9s. Epicentre 9°·3S. 74°·1W. Depth of focus 0·010.
(as on 1949, Nov. 20d.).

Intensity III-IV at Villarica (Pasco). Epicentre 9°·5S. 74°·5W. Depth 100km.

E. Silgado.
Datos sismologicos del Peru, 1951, Bol. No. 8, Lima, 1953, p.11.

A = +·2704, B = −·9492, C = −·1605 ; δ = −14 ; h = +6 ;
D = −·962, E = −·274 ; G = −·044, H = +·154, K = −·987.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Huancayo		3·0	204	i 0 30	−17	i 0 51	−31	—	—
La Paz		9·2	142	2 9	− 2	i 3 51	− 3	i 4 15	SS
Bogota		13·8	0	i 3 28	+16	i 6 4	+20	—	—
Chinchina		14·2	354	i 3 25	+ 7	e 6 23	+30	—	—
Weston		51·5	3	i 9 1	+ 3	—	—	—	—
Tucson		54·2	322	i 9 16	− 2	—	—	e 9 47	pP
Ottawa	z.	54·5	359	e 9 24	+ 4	—	—	—	—
Shawinigan Falls	N.	55·6	2	e 9 31	+ 3	—	—	—	—
Pierce Ferry		58·7	323	i 9 48	− 2	—	—	—	—
Palomar	z.	58·8	318	i 9 49	− 1	—	—	—	—
Boulder City		59·1	322	i 9 51	− 1	—	—	—	—
Overton	z.	59·3	323	i 9 53	− 1	—	—	—	—
Riverside	z.	59·5	319	i 9 53	− 2	—	—	e 10 23	pP
Pasadena	z.	60·1	319	i 9 56	− 3	—	—	e 10 27	pP
China Lake	z.	60·8	321	i 10 1k	− 3	—	—	i 10 43	sP
Logan		61·5	329	e 11 8	PcP	—	—	—	—
Tinemaha	z.	61·9	321	i 10 12k	0	—	—	—	—
Shasta Dam		66·7	322	i 10 39	− 4	—	—	—	—
Hungry Horse		67·3	333	i 10 45	− 1	—	—	—	—
Tamanrasset	z.	84·1	66	i 12 23a	+ 2	—	—	e 12 53	pP
College		91·5	336	i 12 55	− 2	e 16 36	PP	i 13 28	pP

Additional reading :—
La Paz i = 3m.17s., 3m.39s., and 4m.47s.

March 13d. 17h. 44m. 56s. Epicentre 21°·5S. 179°·0W. Depth of focus 0·080.
(as on 1944, May 25d.).

A = −·9311, B = −·0163, C = −·3644 ; δ = 0 ; h = +4 ;
D = −·017, E = +1·000 ; G = +·364, H = +·006, K = −·931.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		10·3	44	e 2 19?	− 3	e 4 4?	−11	—	—
Wellington		20·4	194	e 3 59	− 2	e 7 3	−12	i 14 11	ScS
Cobb River	E.	20·7	198	e 4 4	0	e 7 12	− 8	—	—
Kaimata	N.E.	22·5	199	e 4 22	+ 2	e 7 35	−14	—	—
Brisbane		26·1	252	i 4 50k	− 2	e 8 40	− 6	i 10 44	SS
Riverview		29·0	238	5 18	0	i 9 25	− 7	i 14 50	ScS
Vladivostok		78·6	325	e 11 5	− 2	i 20 19	0	—	—
Lick	z.	79·6	43	e 11 14a	+ 2	—	—	—	—
Pasadena		80·0	47	i 11 15a	+ 1	i 20 39	+ 5	—	—
Fresno	z.	80·5	45	e 11 19	+ 2	e 20 38	− 1	e 14 34	sP
Palomar		80·5	48	i 11 18a	+ 1	i 20 52	+13	i 13 27	pP
Riverside	z.	80·5	47	i 11 18a	+ 1	—	—	e 13 26	pP
Shasta Dam		81·2	40	i 11 22	+ 2	—	—	—	—
China Lake		81·4	46	i 11 23a	+ 2	i 20 44	− 4	—	—
Mineral	z.	81·5	41	e 11 23a	+ 1	—	—	—	—
Tinemaha		81·7	45	i 11 26a	+ 3	e 20 57	+ 6	—	—
Boulder City		83·3	47	i 11 33	+ 2	i 21 3	− 3	—	—
Overton	z.	83·9	47	e 11 36	+ 2	—	—	i 13 46	pP
Tucson		84·3	52	e 11 38	+ 2	—	—	e 13 47	pP
College		89·4	12	e 11 58	− 2	e 21 56	− 7	e 21 31	SKS

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.
		°	°	m. s.	s.	m. s.	s.	m. s.
Hungry Horse		90·5	37	i 12 5	0	e 21 42	[− 2]	— —
Columbia		108·7	59	i 21 22	?	e 29 44	?	— —
Sverdlovsk		124·3	325	17 56	[− 1]	—	—	— —
Scoresby Sund	Z.	129·2	10	i 20 34k	PP	—	—	— —
Yalta		144·3	317	e 18 33	[− 2]	—	—	— —
Copenhagen		144·8	349	i 18 35k	[− 1]	—	—	i 21 19 pPKP
Ksara		146·9	298	i 18 42	[+ 3]	—	—	e 21 56 PP
Uzhgorod		148·0	333	i 18 43	[+ 2]	—	—	— —
Jena	E.	149·5	345	e 18 49	[+ 6]	—	—	— —
Prague		149·6	343	i 18 47	[+ 4]	—	—	e 19 13 PKP_2
Belgrade		151·8	329	e 18 52k	[+ 6]	e 28 50	PKKP	— —
Stuttgart	Z.	152·0	348	e 18 45	[− 1]	—	—	e 21 16 pPKP
Strasbourg		152·4	349	i 18 55a	[+ 8]	—	—	i 19 8 PKP_2
Paris		152·7	357	i 18 55	[+ 8]	—	—	i 19 10 PKP_2
Besançon		154·0	352	e 19 15	PKP_2	—	—	— —
Tamanrasset	Z.	175·7	—	i 19 8a	[+ 1]	e 24 42	PP	i 21 32 pPKP

Additional readings :—
Riverview iN = 12m.31s.
Lick iZ = 11m.30s.
Pasadena iZ = 11m.36s.
Fresno eEN = 20m.44s.
Mineral iZ = 11m.28s. and 11m.55s.
Tinemaha iZ = 11m.42s.
Boulder City iS = 21m.12s.
Jena eEN = 19m.2s.
Prague e = 18m.56s., 19m.4s., and 19m.37s.
Stuttgart iPKPZ = 18m.53s., eZ = 19m.5s.
Tamanrasset $iPKP_2Z$ = 20m.50s., epPPZ = 26m.58s., esPPZ = 27m.52s.

March 13d. Readings also at 0h. (Akhalkalaki, Tsikhlis-Dzhvari, and near Gandzha), 1h. (Overton and Tamanrasset), 3h. (Fresno, Lick, and Mineral), 4h. (La Paz, La Plata, Grahamstown, Tamanrasset, Algiers Univ., Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Lick, Mineral, Shasta Dam, and Hungry Horse), 6h. (Strasbourg and near Kurmenty), 7h. (College, Chatra, and near Bandong), 9h. (Yalta, Logan, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Berkeley, Mineral, Hungry Horse, College, Guadalajara, Vera Cruz, near Oaxaca, Puebla, and Tacubaya), 10h. (Overton, Gandzha, and near Akhalkalaki), 11h. (near Athens), 12h. (Chatra, Puebla, near Tacubaya, and near Messina), 13h. (Puebla and Tacubaya), 14h. (Seattle, Tamanrasset, Helwan, Istanbul, Ksara, Collmberg, near Akhalkalaki, Gandzha, and Tsikhlis-Dzhvari), 15h. (Alicante, Timisoara, Jena, Collmberg, Prague, Stuttgart, Zürich, Triest, near Belgrade, and near Taranto), 16h. (San Juan and near Bogota). 17h. (Boulder City, Shasta Dam, Hungry Horse, College, and near Alicante), 18h. (Tamanrasset (2), Tsikhlis-Dzhvari, near Akhalkalaki, and Gandzha), 20h. (Kurmenty, Andijan, near Almata, Almata II, Chilisk, Frunse, Ili, Krasnogorka, Naryn, Rybach'e, and near Santa Clara), 22h. (Overton, Pierce Ferry, near Santa Clara, and near Ashkabad), 23h. (College, Chinchina, near Bogota, and near Istanbul).

March 14d. 9h. 46m. 55s. Epicentre 50°·8N. 6°·9E. (as on 1950, March 8d.).

Intensity VIII in the district of Euskirchen, Mechernich; III-IV in Western Germany and less strongly in Eastern France and as far as Austria.
Suggested epicentre 50°36′·5N. 6°43′·2E. (Stuttgart).

M. Schwarzbach.
Die Erdbeben des Rheinlandes Kölner, Geologische Hefte, Heft 1, Cologne, 1951, pp. 11, 13, and 21.

H. Berg.
Das Rheinlandbeben bei Euskirchen vom 14 Marz 1951. Geofisica pura e applicata. Italy, 1953, No. 24, pp.57-67.

Anonymous.
Tremblement de terre en France et antres régions de l'Europe. "Astronomie," Fr., April, 1951, vol. 65, pp.169-170.

$A = +\cdot6300$, $B = +\cdot0762$, $C = +\cdot7728$; $\delta = -7$; $h = -6$;
$D = +\cdot120$, $E = -\cdot993$; $G = +\cdot767$, $H = +\cdot093$, $K = -\cdot635$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Heerlen		0·6	278	i 0 15	0	i 0 24	− 2	i 0 17	P	—
De Bilt		1·7	322	i 0 32	+ 1	i 0 54	0	i 0 37	P_g	—
Karlsruhe		2·0	151	i 0 36	+ 1	i 1 0	− 2	i 0 44	P_g	—
Strasbourg		2·3	166	i 0 38k	− 2	i 1 6	− 3	i 0 45	P_g	—
Stuttgart		2·5	143	e 0 41k	− 2	i 1 9	− 5	i 0 52	P_g	—
Sonneberg		2·8	99	i 0 49	+ 2	i 1 22	0	i 0 57	P_g	—
Ebingen		2·9	152	e 0 45	− 3	e 1 29	+ 5	e 0 59	P_g	—
Jena		3·0	85	i 0 51	+ 1	i 1 29	+ 2	i 1 1	P_g	—
Basle		3·3	172	e 0 50	− 3	e 1 33	− 2	e 1 5	P_g	—
Paris		3·4	237	i 0 54?	− 1	i 1 47	S*	i 1 6	P_g	—
Ravensburg		3·5	148	e 0 57k	0	e 1 32	− 8	i 1 58	S_g	—
Besançon		3·6	190	i 0 54	− 4	—	—	—	—	—
Cheb		3·6	99	e 1 0	+ 2	e 1 43	+ 1	e 1 16	P_g	—
Zürich		3·6	161	e 0 56k	− 2	e 1 42	0	e 1 53	S*	—
Neuchatel		3·8	179	e 0 58	− 3	e 2 2	S_g	e 1 11	P*	—
Potsdam	E.	4·1	65	e 1 26	P_g	e 2 9	S*	3 17	—	—
Chur		4·3	155	e 1 7k	− 1	e 2 11	S*	—	—	—
Kew		4·6	282	i 1 12	0	i 2 5	− 2	i 1 27	P_g	—
Prague		4·9	95	i 1 18	+ 1	e 2 15	0	e 1 38	P_g	—
Clermont-Ferrand		5·6	208	i 1 17	−10	i 2 20	−13	i 1 47	P_g	—
Salo		5·7	154	e 1 31	+ 3	e 2 43	+ 8	e 1 53	P_g	—
Pavia		5·8	164	i 1 45k	P*	e 2 35	− 3	e 3 7	S_g	—
Copenhagen		5·9	32	i 1 34	+ 3	2 29	−11	3 0	S*	—
Vienna		6·6	109	e 1 45	+ 4	e 3 38	S_g	—	—	—
Triest		6·9	136	e 1 47	+ 2	i 3 3	− 2	e 2 17	P_gP_g	—
Bologna		7·0	153	e 2 12	P*	e 3 29	S*	—	—	—
Padova		7·2	150	1 50	+ 1	3 17	+ 4	i 3 34	S*	—
Raciborzu		7·3	91	1 53?	+ 3	e 3 20	+ 5	i 2 23	P_g	—
Prato		7·5	156	e 1 59	+ 6	i 3 21	+ 1	—	—	—
Ogyalla		7·9	107	—	—	e 3 45?	?	e 4 17	S_g	—
Aberdeen	E.	8·3	324	i 2 59	P_g	i 4 53	S_g	—	—	i 5·4
Rathfarnham Castle		8·5	292	i 2 9	+ 2	i 3 47	+ 2	i 2 44	P_g	i 6·0
Budapest		8·6	108	2 7	− 2	4 2	+14	—	—	i 4·5
Skalnate Pleso		8·8	95	e 3 15	?	e 3 55	+ 2	e 4 50	S_g	—
Kalossa		9·1	113	e 2 25	+11	e 4 9	+ 9	—	—	5·0
Bergen	N.	9·7	355	—	—	e 4 30	+15	—	—	—
Barcelona		9·9	201	5 1	L	6 37	?	—	—	(5·0)
Uzhgorod		10·2	96	e 2 31	0	e 4 37	+10	—	—	—
Timisoara		10·8	112	e 5 36	S*	—	—	—	—	e 6·2
Belgrade		10·9	118	—	—	e 5 50	S*	—	—	e 6·2
Upsala		10·9	30	—	—	e 4 43	− 1	—	—	i 5·9
Lwow		11·0	88	e 2 40	− 2	e 4 58	+11	—	—	—
Tortosa		11·0	207	e 2 47	+ 5	i 6 2	S_g	i 3 38	P_g	—
Taranto		12·6	141	5 9	S	(5 9)	−17	—	—	—
Toledo		13·3	219	i 3 6	− 7	e 5 45	+ 3	—	—	6·5

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Alicante		13·5	206	4 40	?	7 12	L	—	—	e 8·2
Helsinki	z.	13·8	40	e 3 23	+ 4	—	—	—	—	—
Messina		14·0	151	i 3 30	+ 8	e 6 14	+15	—	—	e 8·5
Algiers Univ.	z.	14·3	193	3 31	+ 5	—	—	—	—	—
Kishinev		14·9	96	3 40	+ 6	6 40	+20	—	—	—
Almeria		15·5	209	i 7 52	?	i 10 40	?	8 12	SSS	13·4
Granada		15·5	213	e 3 43	+ 1	6 47	+12	7 14	SS	i 8·1
Malaga		16·2	214	e 3 20	−30	e 5 38	−73	—	—	8·2
Istanbul		18·2	113	e 4 19	+ 3	e 7 48	+11	—	—	—
Moscow		19·0	61	e 4 27	+ 1	e 8 4	+ 9	—	—	—
Yalta		19·4	98	4 31	+ 1	8 15	+11	—	—	—
Ksara		27·1	117	e 2 54	?	e 10 35	+11	—	—	—
Helwan	z.	27·8	129	e 1 53	?	e 3 5	?	—	—	—
Tamanrasset	z.	28·0	183	e 5 53	− 2	e 10 36	− 2	e 6 43	PP	—
Sverdlovsk		31·6	57	6 27	+ 1	11 40	+ 5	—	—	—
Lenkoran		31·7	95	e 6 22	− 5	—	—	—	—	—
Tashkent		43·1	77	e 8 5	+ 1	—	—	—	—	—
Fergana		45·2	76	e 8 21	+ 1	—	—	—	—	—
Andijan		45·4	76	e 8 28	+ 6	—	—	—	—	—
College		63·0	349	e 10 30	− 1	—	—	—	—	—
Hungry Horse		69·0	323	e 11 7	− 2	—	—	—	—	—
Pretoria	z.	78·5	161	i 12 4	0	—	—	—	—	—
Mineral	z.	78·7	323	e 12 7k	+ 1	—	—	—	—	—
Shasta Dam		78·7	324	e 11 59	− 7	—	—	—	—	—
Tinemaha	z.	80·1	318	e 12 15	+ 2	—	—	—	—	—
Tucson		80·8	311	e 12 18	+ 1	—	—	—	—	—
China Lake	z.	80·9	318	e 12 19	+ 2	—	—	—	—	—
Fresno	z.	81·0	320	e 12 21	+ 3	—	—	—	—	—
Riverside	z.	82·3	317	e 12 28	+ 3	—	—	—	—	—
Pasadena	z.	82·6	317	e 12 27	+ 1	—	—	—	—	—
Palomar	z.	82·7	315	i 12 29	+ 2	—	—	—	—	—

Additional readings :—
De Bilt iS_g =57s.
Karlsruhe i =49s., iEN =1m.8s. and 1m.19s.
Strasbourg iP^* =42s., i =53s. and 1m.3s., iS_g =1m.14s.
Stuttgart iZ =44s., iP^*Z =47s., i =1m.2s., iS^* =1m.17s., iS_g =1m.25s.
Sonneberg iP_gE =1m.3s., iSN =1m.10s., iSE =1m.18s., iS_gN =1m.33s., iN =1m.51s., iE =1m.55s.
Ebingen e =1m.7s., iS_g =1m.37s.
Jena $iP^*?Z$ =54s., $iP^*?EZ$ =59s., iS?N =1m.14s., iE =1m.23s., iS_gZ =1m.40s., iEZ =1m.46s., iN =1m.50s., iE =1m.59s.
Paris iP^* =1m.1s., i =1m.25s. and 1m.50s.
Ravensburg eP^*Z =1m.4s., eZ =1m.17s., e =1m.22s. and 1m.36s., iS^* =1m.46s., i =1m.53s.
Besançon i =1m.0s.
Cheb e =1m.4s., 1m.11s., and 1m.22s., eS^* =1m.52s., eS_g =2m.0s.
Kew iS^* =2m.15s., iS_g =2m.25s.
Prague iE =1m.42s., eE =1m.58s., iE =2m.9s., eN =2m.26s., i =2m.35s., iS_gE =2m.42s.
Salo e =2m.20s. and 2m.27s.
Pavia eN =1m.51s., e =2m.4s. and 2m.20s., i =2m.47s., eE =3m.21s.
Copenhagen 2m.5s.
Vienna i =2m.48s.
Triest ePS =2m.44s., iPS =2m.59s., ePS =3m.30s., iS_gS_g =3m.46s.
Raciborzu eN =3m.29s., iZ =3m.34s., iS_g =4m.5s.
Ogyalla eS^* =4m.22s., eE =4m.34s., eN =4m.37s., eS_gE =4m.44s.
Rathfarnham Castle iZ =2m.22s., iS^* =4m.20s., iEN =4m.28s., iZ =4m.44s., eEN =4m.51s.
Skalnate Pleso eE =4m.10s., eS^*E =4m.20s., eE =4m.36s., eN =4m.39s.
Kalossa eE =2m.42s. and 4m.33s.
Belgrade eZ =6m.2s.
Upsala i =5m.14s., iE =5m.35s., i =6m.28s., iN =6m.41s.
Tortosa iPE =2m.50s., P_gS_g =5m.37s. and 5m.59s., iS_g =6m.8s.
Toledo iPP =3m.19s., i =5m.9s., eS =5m.31s., SSS =6m.1s.
Alicante SS =7m.31s., SSS =7m.43s., phases are wrongly identified.
Tamanrasset eZ =7m.43s. and 11m.52s.
Palomar iZ =12m.44s.
Long waves were also recorded at Scoresby Sund.

March 14d. 10h. 31m. 38s. Epicentre 40°·2N. 142°·2E. Depth of focus 0·005.
(as on 1949, Dec. 5d.).

Intensity IV at Hatinohe ; II-III at Miyako and Morioka.
Epicentre 40°·2N. 142°·5E. Depth of focus 40km.

Seismo. Bull. Cent. Met. Obs., Japan, 1951. Tokyo, 1951, p.68 with macroseismic chart.

$A = -·6052$, $B = +·4694$, $C = +·6429$; $\delta = -8$; $h = -2$;
$D = +·613$, $E = +·790$; $G = -·508$, $H = +·394$, $K = -·766$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Hatinohe		0·6	303	0 13	− 1	0 23	− 2
Miyako		0·6	196	0 12	− 2	0 22	− 3
Morioka		0·9	238	0 17	− 1	0 30	− 1
Aomori		1·2	300	0 26	+ 4	0 44	+ 6
Mizusawa	E.	1·3	218	0 27	+ 4	0 45	+ 5
Isinomaki		1·9	201	0 45	+14	1 5	+11
Urakawa		2·0	13	0 28	− 4	0 57	0
Sendai		2·2	208	0 40	+ 5	1 7	+ 5
Hukusima		2·8	209	0 43	− 1	1 28	+11
Onahama		3·4	198	1 28	S	(1 28)	− 4
Kumagaya		4·6	210	2 16	S	(2 16)	+14

Mizusawa gives also SN = 42s.

March 14d. 12h. 22m. 54s. Epicentre 23°·3S. 66°·4W. Depth of focus 0·010.
(as on 1950, Dec. 11d.).

Intensity III in South latitudes 22°-23° Chile. Epicentre 23°S. 66°·5W. Depth 150km.

F. Greve.
Boletin del año 1951. Instituto sismologico Universidad de Chile, Santiago, p.10.

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
La Paz		6·9	346	i 1 44	+ 4	i 2 45	−13	i 1 58	pP
Huancayo		14·1	321	e 3 12	− 4	—	—	—	—
Ottawa	z.	68·9	353	10 55	− 1	—	—	—	—
Tucson		69·7	320	i 11 0	− 1	—	—	i 11 22	pP
Pierce Ferry		74·3	322	i 11 28	0	—	—	i 11 41	pP
Boulder City		74·6	321	i 11 31	+ 1	—	—	—	—
Riverside	z.	74·8	318	i 11 31	0	—	—	—	—
Pasadena	z.	75·4	318	i 11 35	0	—	—	—	—
China Lake	z.	76·2	320	i 11 39	0	—	—	—	—
Tinemaha	z.	77·4	320	i 11 46	0	—	—	—	—
Mineral	z.	81·5	321	e 12 7	− 1	—	—	—	—
Shasta Dam		82·2	320	i 12 10	− 2	—	—	—	—
Hungry Horse		83·1	331	i 12 17	+ 1	—	—	—	—
Tamanrasset	z.	83·6	61	e 12 30	+11	—	—	—	—
Victoria	z.	87·8	326	(e 12 37)	− 2	—	—	—	—

Additional readings :—
La Paz iP? = 1m.50s., i = 2m.30s.
Huancayo i = 3m.19s.
Pierce Ferry i = 11m.34s. and 12m.46s.
Victoria reading has been increased by 3 minutes.

March 14d. Readings also at 0h. (College and Pierce Ferry), 1h. (College), 2h. (La Plata), 3h. (Apia, Samarkand, Tchimkent, near Khorog, Kulyab, and Stalinabad), 5h. (Mizusawa), 7h. (Andijan, Kulyab, Naryn, Samarkand, Tashkent, Tchimkent, near Fergana, Khorog, Stalinabad, La Paz, and near Huancayo), 8h. (Apia, Tamanrasset, and near Algiers Univ.), 9h. (Athens), 11h. (Alicante, Strasbourg, Ksara, Krasnogorka, Almata, near Almata II, Chilisk, Ili, and Kurmenty), 12h. (Pasadena, Riverside, China Lake, Tinemaha, Shasta Dam, Mineral, Hungry Horse, College, and Chatra), 13h. (College and Tacubaya), 14h. (Tucson, Victoria, College, Fergana, near Andijan, Khorog, Kulyab, Samarkand, and Stalinabad), 15h. (Ashkabad, Kulyab, Frunse, Kurmenty, Przhevalsk, near Almata, Almata II (2), Andijan, Chilisk, Fergana (2), Ili (2), Khorog (2), Naryn (2), Rybach'e (2), Samarkand, Stalinabad, Tashkent, and Tchimkent (2)), 16h. (College and Chatra), 17h. (Istanbul and near Alicante), 18h. (Athens), 19h. (Tamanrasset, Wellington, Almata II, Fergana, Frunse, Kurmenty, Przhevalsk, near Almata, Chilisk, Ili, Krasnogorka, Naryn, and Rybach'e), 20h. (Apia, Tucson, Overton, Pierce Ferry, College, and near Santa Clara), 21h. (Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Krasnogorka, near Almata, Almata II, Chilisk, Ili, Kurmenty, Przhevalsk, and near Algiers Univ.), 22h. (Apia, Tamanrasset (2), Huancayo, La Paz, La Plata, Pierce Ferry, and Hungry Horse), 23h. (Ashkabad, Andijan, Fergana, Kulyab, Samarkand, Stalinabad, Tashkent, Tchimkent, near Kizyl-Arvat, and Mary).

March 15d. 20h. Undetermined shock.

Oaxaca P =37m.11s., L =37m.43s.
Puebla P =37m.18s., L =37m.56s.
Tacubaya P =37m.23s., L =38m.6s.
Vera Cruz P =37m.34s., L =38m.31s.
Guadalajara e =39m.37s.
Tucson eP =40m.51s., e =42m.6s., eL =46m.37s.
Palomar iPZ =41m.36s.
Pierce Ferry eP =41m.40s., eScP =49m.10s., ePcS =49m.29s.
Boulder City eP =41m.43s., ePcS =49m.23s.
Riverside ePZ =41m.44s.
Overton iPZ =41m.46s., iZ =47m.48s.
Pasadena ePZ =41m.46s.
China Lake ePZ =41m.56s., iZ =42m.4s.
Tinemaha iPZ =42m.8s.
Hungry Horse eP? =43m.11s.
College eP =46m.21s., e =46m.28s., eL =69m.0s.

March 15d. Readings also at 0h. (near Przhevalsk (2), Kurmenty (2), Chilisk (2), Almata II (2), and Ili (2)), 1h. (La Paz, Tamanrasset, near Algiers Univ., near Kurmenty, and Almata II), 4h. (Istanbul, College, near Balboa Heights, and near Yuzno-Sakhlinsk), 5h. (Tamanrasset, Andijan, Fergana, Tchimkent, Kulyab, near Przhevalsk, Almata, Chilisk (2), Naryn, Rybach'e, Ili (2), Frunse, Kurmenty (2), Almata II, and near La Paz), 6h. (Mizusawa, Tamanrasset, Istanbul, and near Athens), 7h. (Tamanrasset, near Algiers Univ., near Granada (2), Malaga (2), Almeria (2), Toledo, Alicante, near Puebla, Tacubaya, and Vera Cruz), 8h. (near Chilisk and Kurmenty), 10h. (Tamanrasset, Ksara, Grozny, near Erevan, Leninakan, Kirovobad, Tiflis, Gori, Shemakha, Lenkoran, Fergana, near Khorog, Stalinabad, Kulyab, and Tchimkent), 11h. (near Granada and Malaga), 12h. (near Yalta and near Klyuchi), 13h. (College, Boulder City, Overton, and Pierce Ferry), 14h. (near Apia), 15h. (Overton, Pierce Ferry, and near Tchimkent), 16h. (College and Chatra), 18h. (Riverside, Palomar, China Lake, Tucson, Hungry Horse, Shasta Dam, near College, near Theodosia, and Yalta), 19h. (near Klyuchi), 20h. (Lick), 22h. (near Athens, near Granada, and Malaga).

March 16d. 1h. 35m. 48s. Epicentre 50°·8N. 6°·9E. (as on 14d.).

Slight at Cologne. Suggested epicentre 50°36′·5N. 6°43′·2E.
Monthly seismic bulletin, Stuttgart.

		△	Az.	P.	O—C.	S.	O—C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Strasbourg		2·3	166	—	—	e 1 4	− 5	—	—
Stuttgart	z.	2·5	143	e 0 47?	P_g	e 1 19	S*	e 1 21	S_g e 1·4
Jena		3·0	85	e 0 58	P_g	e 1 36	S*	e 1 38	S_g e 1·7
Paris		3·4	237	i 1 0	P*	i 1 39	+ 2	i 1 45	S* —
Besançon		3·6	190	—	—	e 1 40	− 2	e 1 57	S_g e 2·1
Prague		4·9	95	—	—	e 2 35	S*	i 2 38	S_g —

Additional readings :—
Stuttgart eZ =52s. and 55s.
Jena eP_g?E =1m.0s., eE =1m.10s.
Besançon eS* =1m.50s.

March 16d. 13h. 3m. 7s. Epicentre 36°·2N. 139°·9E. Depth of focus 0·005.
(as on 1949, December 25d.).

Intensity V at Simodate and Horigome ; IV at Utunomiya, Mizukaido, Simozuma, Nikko, and Numata ; II-III at Tukubasan, Kumagaya, Tokyo, Mito.
Epicentre 36°·1N. 139°·9E. ; depth 40-60km.
Seismological Bulletin of the Cent. Met. Obs., Japan, for March, 1951, Tokyo, 1951, p. 68, with macroseismic chart.

$A = -\cdot6187$, $B = +\cdot5210$, $C = +\cdot5880$; $\delta = -3$; $h = 0$;
$D = +\cdot644$, $E = +\cdot765$; $G = -\cdot450$, $H = +\cdot379$, $K = -\cdot809$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Tukubasan		0·2	84	0 8	− 3	0 16	− 3
Utunomiya		0·3	356	0 11k	− 1	0 19	− 1
Kumagaya		0·4	263	0 10a	− 2	0 20	− 2
Mito		0·5	68	0 14k	+ 1	0 23	0
Tokyo		0·5	192	0 13a	0	—	—
Maebasi		0·7	287	0 14a	− 1	0 24	− 3
Titibu		0·7	252	0 14	− 1	0 24	− 3
Yokohama		0·8	195	0 19	+ 2	0 29	0
Shirakawa		0·9	15	0 19	+ 1	0 32	+ 1
Tyosi		0·9	121	0 19	+ 1	0 29	− 2
Oiwake		1·1	277	0 20	0	0 33	− 3
Onahama		1·1	48	0 23	+ 3	0 37	+ 1
Hunatu		1·2	233	0 21	− 1	0 38	0
Kohu		1·2	242	0 23	+ 1	0 40	+ 2
Mera		1·3	182	0 22	− 1	0 40	0
Misima		1·3	215	0 19	− 4	0 32	− 8
Inawasiro		1·4	7	0 25	+ 1	0 46	+ 3
Matusiro		1·4	284	0 25	+ 1	0 42	− 1
Nagano		1·4	289	0 26	+ 2	—	—
Hukusima		1·6	16	0 29	+ 2	0 49	+ 2
Matumoto		1·6	271	0 30	+ 3	0 45	− 2
Takada		1·6	304	0 31	+ 4	—	—
Shizuoka		1·7	225	0 29	+ 1	0 49	− 1
Omaesaki		2·1	221	0 58	S	(0 58)	− 1
Sendai		2·2	21	0 36	+ 1	1 3	+ 1
Nagoya		2·6	247	0 44	+ 3	1 19	+ 7
Gihu		2·7	253	0 55	+13	1 15	+ 1
Hikone		3·1	253	1 5	+17	—	—
Kameyama		3·1	244	1 4	+16	1 44	+20
Mizusawa	E.	3·1	18	e 1 8	+20	1 30	+ 6
Tsuruga		3·2	261	0 58	+ 9	—	—
Morioka		3·6	16	0 58	+ 2	1 38	+ 1
Osaka		3·9	248	1 27	+28	2 10	+26
Sumoto		4·5	247	1 39	+32	—	—

March 16d. 13h. 56m. 50s. Epicentre 30°·5N. 97°·5E. (as on 1950, November 2d.).

$A = -\cdot1127$, $B = +\cdot8557$, $C = +\cdot5050$; $\delta = -5$; $h = +2$;
$D = +\cdot991$, $E = +\cdot131$; $G = -\cdot066$, $H = +\cdot501$, $K = -\cdot863$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		9·8	251	e 2 26	+ 2	i 4 17	0	4 52	S*	4·6
Calcutta	N.	11·4	228	e 2 50	+ 3	i 4 58	+ 2	—	—	5·4
New Delhi		17·8	269	e 4 7	− 4	i 7 12	−16	4 20	PP	—
Nanking		18·3	79	e 4 18	+ 1	7 46	+ 7	—	—	i 9·4
Almata II		20·5	315	i 4 40	− 2	—	—	—	—	—
Naryn		20·5	309	e 4 41	− 1	i 8 25	− 2	—	—	—
Zi-ka-wei	Z.	20·6	81	4 44	+ 1	8 46	+17	i 5 18	PPP	9·6
Almata		20·8	315	i 4 46	+ 1	i 8 35	+ 2	—	—	—
Rybach'e		20·9	311	i 4 43	− 3	i 8 31	− 4	—	—	—
Ili		21·0	317	i 4 45	− 2	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Frunse		22·1	310	i 4 57	− 2	i 9 2	+ 4	—	—	—
Irkutsk		22·3	12	5 1	0	e 9 7	+ 5	—	—	—
Khorog		22·5	294	i 5 2	0	9 8	+ 3	—	—	—
Kabansk		22·6	14	5 3?	0	e 9 14?	+ 7	—	—	—
Andijan		22·8	303	5 5	0	i 9 17	+ 6	—	—	—
Fergana		23·1	303	e 5 7	− 1	e 9 18	+ 2	—	—	—
Kulyab		24·0	296	i 5 18	+ 1	i 9 34	+ 2	—	—	—
Poona		24·6	246	i 5 23	0	i 9 42	0	6 4	PP	11·7
Stalinabad		24·9	298	i 5 25	− 1	i 9 49	+ 2	—	—	—
Lunacharskoe		25·1	304	5 31	+ 3	—	—	—	—	—
Bombay		25·2	248	e 5 30	+ 1	e 9 55	+ 3	6 27	PPP	12·0
Tashkent		25·2	304	i 5 28	− 1	i 9 49	− 3	—	—	—
Samarkand		26·5	299	e 5 42	+ 1	—	—	—	—	—
Kodaikanal	E.	27·5	228	i 4 55	−55	i 9 3	PcP	—	—	11·6
Colombo	E.	28·7	219	5 30	−31	11 48	+58	—	—	17·2
Vladivostok		30·1	55	e 6 11	− 2	e 11 8	− 4	—	—	—
Ashkabad		33·0	294	e 6 40	+ 1	e 11 53	− 4	—	—	—
Sverdlovsk		36·7	327	i 7 10	0	12 52	− 2	—	—	—
Baku		39·6	299	e 7 40	+ 5	—	—	—	—	—
Kirovobad		42·3	300	7 58	+ 1	14 18	− 1	—	—	—
Tiflis		43·4	301	e 8 8	+ 2	—	—	—	—	—
Leninakan		44·2	300	e 8 20	+ 8	—	—	—	—	—
Moscow		48·6	320	e 8 46	− 1	e 15 45	− 4	—	—	—
Ksara		51·6	291	i 9 11	+ 1	e 16 1	−30	—	—	—
Pulkovo		52·8	325	e 9 17	− 2	—	—	—	—	—
Helwan	z.	56·4	288	e 9 44	− 1	e 17 36	0	—	—	—
Uzhgorod		58·4	312	e 10 0	0	—	—	—	—	—
Copenhagen		62·7	322	i 10 27	− 2	e 19 0	+ 3	—	—	31·2
Prague		63·0	315	e 10 31	0	—	—	—	—	—
Collmberg	z.	63·6	316	e 10 33	− 2	—	—	—	—	—
Jena		64·5	316	e 10 39	− 2	—	—	e 13 3	PP	—
Stuttgart		66·7	314	i 10 54k	− 1	—	—	e 10 57	P	e 37·2
Chur		67·2	312	e 10 40	?	—	—	e 10 56	P	—
Zürich		67·6	313	e 10 58	− 3	—	—	—	—	—
Strasbourg		67·7	314	e 10 57	− 4	—	—	—	—	e 37·2
De Bilt		67·9	319	—	—	e 27 10	SSS	—	—	—
Besançon		69·3	314	i 11 9	− 2	—	—	e 11 37	PcP	—
Paris		70·8	317	i 11 19	− 1	i 20 18	−17	e 13 58	PP	e 39·2
College		72·4	24	i 11 28	− 2	—	—	i 13 52	PP	e 38·9
Resolute Bay	z.	74·8	4	e 11 43	− 1	—	—	e 12 4	PcP	—
Algiers Univ.	z.	75·7	304	12 46	+57	—	—	—	—	—
Toledo		79·1	310	i 12 7	− 1	e 22 46	PS	—	—	—
Tamanrasset	z.	80·4	291	i 12 14s	− 1	—	—	e 15 36	PP	—
Pretoria	z.	86·8	238	i 12 48	+ 1	—	—	—	—	—
Hungry Horse		96·6	21	e 13 33	0	—	—	—	—	—

Additional readings :—
Chatra PPE =2m.31s., PPPE =2m.39s., P*E =2m.48s., P_gE =3m.15s., Q =4m.6s., SS =4m.29s., SSSEZ =4m.38s.
New Delhi PPPEN =4m.27s., SSEN =7m.31s.
Poona PPPE =6m.12s., P_cPE =8m.57s., QEN =10m.25s., SSEN =10m.44s., SSSEN =10m.53s., S_cSPEN =12m.22s.
Bombay PPPN =6m.32s., eSN =10m.0s., QN =10m.52s.
Prague e =10m.45s., 11m.44s., and 12m.18s.
Jena eE =10m.44s., eN =11m.16s. and 12m.57s.
Besançon e =11m.19s.
College i =11m.36s. and 13m.44s.
Resolute Bay eZ =13m.43s.
Tamanrasset ePPP?Z =17m.42s., iZ =18m.28s., eZ =21m.9s.
Hungry Horse i =13m.41s.
Long waves were also recorded at Bandong, Djakarta, Upsala, and Kew.

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.

March 16d. 17h. Two shocks.

Antofagasta iPE =35m.18s., iLE =35m.46s.
Copiapo iPN =35m.40s. and 36m.29s.
Palisades I iP? =41m.26s., II iP =47m.51s., i =48m.1s., eS? =52m.0s.
San Juan II iP =43m.12s., iS =43m.30s., i =43m.32s., iL =43m.56s.
Fort de France e =44m.14s., eS? =45m.24s.
Harvard I iP? =45m.18s., II eP =48m.12s., eS =52m.11s.
Tucson I eP =45m.37s.
Overton I iPZ =45m.58s., II ePZ =51m.11s.
Riverside iPZ =46m.8s.k.
Pasadena iPZ =46m.10s.
China Lake iPZ =46m.15s.k.
Tinemaha iPZ =46m.22s.
Hungry Horse I iP =46m.53s., II e =51m.26s.
Tamanrasset eZ =47m.6s., 47m.37s., and 53m.22s.
Weston II eP =48m.8s., eS =52m.10s.

March 16d. 18h. 42m. 22s. Epicentre 32°·0N. 100°·5E. (given by U.S.S.R. network).

A = −·1548, B = +·8354, C = +·5273; δ = −10; h = +1;
D = +·983, E = +·182; G = −·096, H = +·518, K = −·850.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		12·7	260	e 2 37	−28	i 10 38?	?	—	—	
Calcutta	N.	14·3	232	e 5 0	?	i 6 40	SSS	—	—	
Irkutsk		20·5	5	e 4 43	+ 1	e 8 25	− 2	—	—	
Almata		21·7	309	i 4 57	+ 2	e 8 49	− 2	—	—	
Naryn		21·7	303	e 4 53	− 2	8 41	−10	—	—	
Rybach'e		22·0	305	e 4 57	− 1	e 8 48	− 8	—	—	
Frunse		23·2	305	e 5 7	− 2	—	—	—	—	
Andijan		24·2	298	5 19	0	i 9 31	− 4	—	—	
Khorog		24·8	292	e 5 17	− 8	—	—	—	—	
Stalinabad		26·6	294	i 5 37	− 5	10 3	−13	—	—	
Tashkent		26·6	300	e 5 44	+ 2	e 10 8?	− 8	—	—	
Tchimkent		26·6	302	e 5 41	− 1	—	—	—	—	
Samarkand		28·1	296	e 5 53	− 2	—	—	—	—	
Stuttgart	Z.	67·5	314	e 11 4	+ 4	—	—	—	—	
Scoresby Sund	Z.	69·9	342	i 9 42k	−93	—	—	—	—	
College		70·0	25	e 11 40	+25	—	—	e 11 47	PcP	

Long waves were recorded at Nanking.

March 16d. 19h. 35m. 30s. Epicentre 52°·5N. 167°·5W. (as on 1950, July 14d.).

A = −·5968, B = −·1323, C = +·7914; δ = −1; h = −6;
D = −·216, E = +·976; G = −·773, H = −·171, K = −·611.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mitchell Field		5·6	268	i 1 25	− 2	i 2 31	− 2	—	—	—
College		16·0	32	e 3 46	− 2	—	—	—	—	i 8·5
Sitka		19·0	63	e 4 34	+ 8	e 8 5	+10	—	—	e 10·5
Shasta Dam		32·6	93	i 6 38	+ 3	—	—	e 9 20	PcP	—
Mineral	Z.	33·3	93	i 6 42a	+ 1	—	—	—	—	—
Hungry Horse		33·7	75	i 6 46	+ 1	—	—	i 9 24	PcP	—
Berkeley		34·5	97	i 6 54a	+ 2	e 14 40	SS	e 17 7	ScS	e 17·6
Lick	Z.	35·2	97	i 6 59k	+ 1	—	—	—	—	—
Fresno		36·7	96	e 7 13	+ 3	—	—	—	—	—
Tinemaha		37·4	94	i 7 20a	+ 4	—	—	i 7 34	pP	—
Logan		38·5	83	e 8 24	+58	—	—	—	—	—
China Lake	Z.	38·6	95	i 7 28a	+ 2	—	—	i 7 41	pP	—
Pasadena		39·4	97	i 7 36	+ 3	—	—	i 7 48	pP	—
Riverside	Z.	40·0	97	i 7 39	+ 1	—	—	—	—	—
Overton	Z.	40·1	92	i 7 41	+ 2	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Boulder City		40·2	93	i 7 42	+ 2	—	—	—	—	—
Pierce Ferry		40·6	92	e 7 45	+ 2	—	—	—	—	—
Palomar		40·7	97	i 7 46	+ 2	—	—	i 7 59	pP	—
Tucson		45·2	93	e 8 21	+ 1	—	—	e 8 35	pP	—
Scoresby Sund	z.	54·8	15	i 9 31	− 3	—	—	—	—	—
Ottawa	z.	56·8	58	e 9 47	− 1	—	—	—	—	—
Shawinigan Falls	N.	57·5	55	e 9 52	− 1	—	—	—	—	—
Morgantown		58·5	66	i 9 59	− 1	—	—	—	—	—
Palisades		60·8	60	i 10 15	− 1	—	—	i 10 55	PcP	e 35·1
Harvard		60·9	58	i 10 17	0	—	—	—	—	—
Weston		61·1	58	i 10 18	0	—	—	—	—	—
Collmberg	z.	76·6	0	e 11 52	− 2	—	—	—	—	—
Prague		77·8	359	e 12 11	PcP	—	—	—	—	—
Paris		78·7	8	i 12 4	− 2	—	—	i 12 15	PcP	—
Stuttgart	z.	79·1	4	e 12 6a	− 2	—	—	—	—	—
Strasbourg		79·2	3	i 12 6	− 2	—	—	—	—	—
Basle		80·2	4	i 12 12	− 2	—	—	—	—	—
Besançon		80·5	6	e 12 14	− 1	—	—	—	—	—
Zürich		80·5	4	i 12 14a	− 1	—	—	—	—	—
San Juan		82·3	71	i 12 25	0	—	—	i 12 37	PcP	—

Additional readings :—
Mineral iZ =6m.49s. and 6m.59s.
Berkeley iZ =7m.20s.
Lick iZ =7m.2s. and 7m.26s.
China Lake iPcPZ =9m.38s.
Prague e =12m.52s. and 13m.44s.
Long waves were also recorded at Almeria and Granada.

March 16d. Readings also at 0h. (Chatra, Granada, Malaga, Puebla, Tacubaya, Fergana, Samarkand, near Khorog, and Kulyab), 4h. (Wellington and Pietermaritzberg), 5h. (Clermont-Ferrand), 10h. (College), 11h. (near Ashkabad), 12h. (College and near Hungry Horse), 13h. (near Alicante (2)), 14h. (Kodaikanal, College, Apia, and La Paz), 15h. (Pietermaritzburg, Apia, Colombo, Bombay, Kodaikanal, Zi-ka-wei, Bandong, Djakarta, Brisbane, Tamanrasset, Overton, and Pierce Ferry ; several shocks), 16h. (College), 17h. (near Khorog), 18h. (Pretoria, Puebla, Vera Cruz, and near Tacubaya), 19h. (College), 21h. (College and near Almata II), 22h. Tamanrasset, China Lake, Overton, Khorog, Stalinabad, near Kulyab, and near New Delhi), 23h. (College and near Huancayo).

March 17d. 4h. 27m. 29s. Epicentre 30°·5N. 97°·5E. (as on 16d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		9·8	251	e 2 25	+ 1	i 4 19	+ 2	2 32	PP	4·1
Calcutta	E.	11·4	228	i 2 51	+ 4	i 5 3	+ 7	—	—	5·4
Dehra Dun	N.	16·8	274	e 4 43?	?	—	—	—	—	—
New Delhi		17·8	269	e 4 6	− 5	7 31	+ 3	4 18	PP	—
Nanking		18·3	79	i 4 18	+ 1	i 7 47	+ 8	i 4 22	P	i 9·4
Przhevalsk		19·4	315	i 4 29	− 1	—	—	—	—	—
Almata II		20·5	315	i 4 41	− 1	—	—	—	—	—
Naryn		20·5	309	e 4 40	− 2	i 8 26	− 1	—	—	—
Zi-ka-wei	z.	20·6	81	i 4 46	+ 3	8 38	+ 9	5 12	PP	10·3
Almata		20·8	315	i 4 44	− 1	i 8 34	+ 1	—	—	—
Rybach'e		20·9	311	i 4 43	− 3	i 8 31	− 4	—	—	—
Ili		21·0	317	i 4 44	− 3	e 8 39	+ 2	—	—	—
Hyderabad		21·7	237	i 4 55	0	i 9 3	+12	—	—	11·5
Frunse		22·1	310	i 4 58	− 1	i 9 0	+ 2	—	—	—
Irkutsk		22·3	12	i 5 11?	+10	9 8?	+ 6	—	—	—
Khorog		22·5	294	5 2	0	9 10	+ 5	—	—	—
Kabansk		22·6	14	i 5 3	0	e 9 9?	+ 2	—	—	—
Andijan		22·8	303	5 4	− 1	i 9 13	+ 2	—	—	—
Fergana		23·1	303	e 5 7	− 1	i 9 17	+ 1	—	—	—
Semipalatinsk		23·7	333	e 5 20	+ 6	e 9 30	+ 3	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kulyab		24·0	296	i 5 16	− 1	i 9 34	+ 2	—	—	—
Poona		24·6	246	i 5 24	+ 1	i 9 44	+ 2	6 1	PP	11·5
Stalinabad		24·9	298	i 5 24	− 2	i 9 42	− 5	—	—	—
Lunacharskoe		25·1	304	e 5 29	+ 1	—	—	—	—	—
Bombay	E.	25·2	248	i 5 31	+ 2	i 9 55	+ 3	11 2	SSS	12·3
Tashkent		25·2	304	i 5 28	− 1	i 9 47	− 5	—	—	—
Tchimkent		25·2	307	5 29	0	—	—	—	—	—
Samarkand		26·5	299	e 5 41	0	—	—	—	—	—
Kodaikanal	E.	27·5	228	i 5 55	+ 5	i 10 47	+17	11 57	Q	13·3
Colombo	E.	28·7	219	6 11	+10	10 56	+ 6	—	—	17·5
Vladivostok		30·1	55	i 6 12	− 1	i 11 8	− 4	—	—	—
Ashkabad		33·0	294	i 6 40	+ 1	12 1	+ 4	—	—	—
Mizusawa		36·5	63	8 41	PP	19 13	L	8 47	PPP	(19·2)
Sverdlovsk		36·7	327	e 7 10	0	i 12 52	− 2	—	—	—
Djakarta		37·6	163	i 7 24	+ 6	i 13 16	+ 8	—	—	—
Bandong		38·4	161	—	—	e 13 40	+20	—	—	—
Baku		39·6	299	e 7 36	+ 1	e 13 42	+ 4	—	—	—
Lenkoran		40·5	296	7 43	+ 1	—	—	—	—	—
Kirovobad		42·3	300	7 58	+ 1	i 14 17	− 2	—	—	—
Grozny		42·7	302	e 8 2	+ 2	—	—	—	—	—
Tiflis		43·4	301	e 8 6	0	—	—	—	—	—
Moscow		48·6	320	e 8 46	− 1	e 15 46	− 3	—	—	—
Yalta		51·0	304	9 7	+ 1	16 20	− 2	—	—	—
Ksara		51·6	291	i 9 12a	+ 2	i 16 41	+10	—	—	—
Pulkovo		52·8	325	i 9 19	0	i 16 46	− 1	—	—	—
Kishinev		54·3	310	9 29	− 1	17 3	− 4	—	—	—
Istanbul	z.	55·2	301	e 9 38	+ 1	—	—	e 11 43	PP	—
Helsinki		55·5	326	e 9 35	− 4	e 17 18	− 6	—	—	—
Helwan		56·4	288	i 10 0a	+15	17 33	− 3	10 46	PcP	—
Lwow		57·1	313	i 9 51	+ 1	i 17 42	− 3	—	—	—
Uzhgorod		58·4	312	i 10 2	+ 2	18 1	− 1	—	—	—
Upsala		59·2	325	e 10 6	+ 1	i 18 11	− 1	e 12 17	PP	e 28·5
• Skalnate Pleso		59·6	313	e 10 17	+ 9	e 18 19	+ 2	e 25 1	SSS	33·0
Belgrade	z.	60·5	307	e 10 17k	+ 3	—	—	e 10 55	PcP	—
Budapest		60·8	311	10 16	0	e 18 31?	− 2	e 12 31?	PP	31·5
Kalossa		61·1	310	9 29	−49	—	—	—	—	—
Copenhagen		62·7	322	e 10 31	+ 2	e 18 59	+ 2	—	—	26·5
Prague		63·0	315	e 10 31	0	e 18 57	− 4	e 12 55	PP	e 32·5
Collmberg		63·6	316	10 34	− 1	—	—	e 31 22	Q	e 36·0
Taranto		64·0	303	10 40	+ 2	e 22 41	SS	13 10	PP	—
Cheb		64·3	315	10 48	+ 9	e 19 13	− 4	e 13 5	PP	—
Jena	E.	64·5	316	e 10 39?	− 2	e 19 19	0	e 13 15	PP	—
	N.	64·5	316	e 10 42	+ 1	e 19 19	0	e 13 7	PP	—
Triest		64·8	310	i 10 38a	− 5	i 19 21	− 2	e 11 24	PcP	—
Messina		66·0	302	e 10 48	− 2	e 19 36	− 2	i 11 17	PcP	—
Padova		66·4	309	e 10 29?	−24	19 41	− 2	—	—	—
Stuttgart		66·7	314	i 10 53k	− 2	e 19 45	− 1	e 24 3	SS	e 36·5
Bologna		66·8	309	e 11 15	+19	e 19 53	+ 5	—	—	—
Rome		66·9	306	e 10 54	− 2	e 19 47	− 2	24 7	SS	e 34·3
Salo		66·9	311	e 10 57	+ 1	e 23 33	?	—	—	—
Florence		67·1	308	e 11 0	+ 3	—	—	—	—	—
Prato		67·2	308	e 11 4	+ 6	e 19 52	0	—	—	—
Zürich		67·6	313	e 10 59	− 2	e 19 49	− 8	—	—	—
Strasbourg		67·7	314	e 10 59	− 2	e 20 2	+ 4	e 13 31	PP	e 32·5
De Bilt		67·9	319	—	—	e 27 31?	SSS	—	—	e 37·5
Pavia		68·0	311	e 11 5a	+ 2	i 20 4	+ 2	—	—	e 36·8
Basle		68·1	313	e 11 5	+ 1	—	—	—	—	—
Besançon		69·3	314	e 11 10	− 1	—	—	e 11 27	PcP	—
Scoresby Sund		70·5	342	e 11 20	+ 2	e 20 37	+ 5	21 27	PPS	36·5
Paris		70·8	317	i 11 19	− 1	i 20 39	+ 4	i 13 59	PP	e 37·5

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kew		71·3	319	e 11 22	− 1	e 20 46	+ 5	e 21 30	PPS	e 37·5
College		72·4	24	i 11 29	− 1	i 20 53	0	e 14 12	PP	e 29·6
Rathfarnham Castle		73·7	323	i 11 36	− 2	e 21 8	0	e 14 29	PP	e 35·5
Resolute Bay		74·8	4	11 44	0	e 30 1	SSS	14 31	PP	—
Tortosa		75·6	309	e 11 48	0	i 21 29	0	—	—	e 39·5
Algiers Univ.	z.	75·7	304	e 11 47	− 2	—	—	—	—	—
Alicante		77·4	307	11 54	− 4	20 48	−61	29 56	Q	e 34·9
Toledo		79·1	310	e 12 8	0	e 22 4	− 3	—	—	—
Almeria		79·5	306	i 12 9	− 1	22 15	+ 4	15 11	PP	45·6
Granada		80·1	307	12 15	+ 2	i 22 9	− 9	i 27 27	SS	41·0
Tamanrasset	z.	80·4	291	i 12 15a	0	e 22 23	+ 2	i 12 50	?	—
Malaga		80·9	307	i 12 18	+ 1	e 22 4	−22	—	—	50·3
Riverview		81·6	137	i 12 27a	+ 6	i 22 43	+10	i 22 59	sS	38·5
Pretoria	z.	86·8	238	i 12 59	+12	—	—	—	—	—
Victoria		93·2	26	e 13 21	+ 4	—	—	—	—	52·5
Hungry Horse		96·6	21	e 13 34	+ 1	—	—	—	—	—
Shasta Dam		100·1	30	e 17 41	PP	—	—	—	—	—
Mineral	z.	100·7	30	e 13 53a	+ 1	—	—	i 18 1	PP	—
Fresno	z.	104·5	30	18 20	[− 2]	—	—	—	—	—
Tinemaha	z.	104·9	29	e 18 20	[− 3]	—	—	i 18 34	PP	—
China Lake	z.	106·2	29	e 18 13	[−12]	—	—	i 18 39	PP	—
Overton	z.	106·9	27	e 17 49	[−38]	—	—	i 18 44	PP	—
Pasadena	z.	107·5	30	i 18 49	PP	—	—	—	—	—
Lincoln	E.	107·8	11	e 20 12	?	e 28 7	PS	e 39 47	Q	e 55·2
Tucson		112·1	26	e 18 40	[+ 3]	—	—	e 19 25	PP	e 64·5
Chinchina		144·1	349	i 19 33	[− 5]	—	—	i 22 53	PP	76·5
Bogota		144·2	346	i 19 39	[+ 1]	e 23 25	SKP	—	—	—
Huancayo		160·5	340	e 20 8	[+ 7]	—	—	20 48	PKP_2	—

Additional readings :—
Chatra PPPEZ =2m.40s., P*EZ =2m.52s., P_g =3m.18s., SS =4m.28s., SSS =4m.38s., S* =4m.54s.
New Delhi iSEN =7m.12s., SSSN =7m.43s.
Zi-ka-wei P_cP?Z =7m.51s., iZ =8m.49s., SSZ =9m.15s.
Poona PPPE =6m.11s., P_cPE =8m.49s., QE =10m.25s., SSE =10m.37s., SSSE =10m.55s., S_cPE =12m.17s.
Bombay PPPE =6m.42s., QE =10m.42s.
Helwan eZ =11m.40s., eN =19m.35s.
Upsala eN =13m.15s., iPPPE =13m.27s., eN =15m.28s., eE =17m.4s., iPSN =18m.16s., eS_cSN =19m.52s., eSS? =22m.7s., eSSSN =24m.17s.
Skalnate Pleso e =11m.43s.
Belgrade ePPZ =12m.56s.
Budapest ePN =10m.19s., eN =10m.46s., eE =17m.58s., eEN =25m.31s.?
Prague e =10m.54s., 11m.15s., 11m.44s., and 12m.9s., ePS =19m.16s., e =21m.3s., eSS =23m.12s.
Cheb e =11m.49s., 15m.50s., 17m.56s., 18m.31s., and 18m.55s., eSS =23m.14s., e =25m.24s., eSSS =25m.53s.
Jena eN =10m.45s.
Triest eSSS =26m.51s.
Messina ePP? =13m.23s., eSS =24m.4s.
Stuttgart eZ =11m.2s., eP_cPZ =11m.13s., eSSS =27m.11s.
Rome ePSN =20m.33s., SSS =27m.19s.
Strasbourg e =12m.13s., 17m.1s., and 19m.41s., eS_cS =20m.58s., eSS =24m.4s., eSSS? =25m.46s., eQ =27m.59s., e =29m.48s., ePKKP =31m.14s.
Pavia e =28m.13s.
Besançon e =12m.16s. and 14m.30s.
Paris i =11m.25s., ePPP =20m.29s., e =26m.3s., iSSS =28m.51s.
Kew eSSSEN =28m.49s.
Rathfarnham Castle eEN =28m.31s.
Resolute Bay eZ =11m.56s., 12m.9s., and 13m.9s., eEN =23m.22s., 26m.22s., and 32m.1s.
Almeria PPP =16m.59s., SS =27m.23s.
Granada PP =15m.6s., PS =22m.57s., SSS =31m.6s.
Mineral ePKPZ =17m.44s.
Tucson e =19m.5s.
Long waves were also recorded at Ivigtut, Ogyalla, Aberdeen, Bergen, Potsdam, Berkeley, Ottawa, Seven Falls, Weston, Seattle, Harvard, La Plata, Palisades, and Wellington.

March 17d. 9h. South Pacific.

Wellington ePiZ =58m.52s., iZ =60m.20s., S? =64m.50s., Q =67·5m., L =72·6m.
Riverview iPZ =61m.22s.k, iSN =69m.17s., iPSE =69m.35s., eLEZ =77·9m.
La Paz P =61m.26s., PPZ =63m.50s., iS =69m.50s., i =70m.2s., Q =81m.0s.
Huancayo e =62m.7s., eS? =69m.48s., e =71m.0s., eSS? =74m.6s., eL =76m.51s.
Chinchina iP =63m.0s., eSEN =72m.36s., eLEN =86m.36s.
Bogota ePEN =63m.26s., eS?EN =72m.44s., eEN =77m.44s. and 88m.4s.
Tucson eP? =64m.17s., eL =92m.53s.
Pasadena eZ =64m.23s., eLE =80m.0s.
China Lake ePZ =64m.32s.
Overton ePZ =64m.43s.
Christchurch SEN =64m.50s., eQEN =67m.30s., eLZ =68m.50s.
La Plata N =69m.6s. and 73m.30s., LN =74·6m.
Tamanrasset ePKPZ =70m.43s., eZ =73m.35s.
Scoresby Sund ePKPZ =71m.4s.
Paris iPKP =71m.16s., i =71m.22s. and 71m.29s., eL =142m.
Apia P? =71m.17s., S?EN =74m.0s.
Stuttgart ePKPiZ =71m.18s.?, eZ =71m.32s.
Ksara ePKP? =71m.31s.?, PPS? =88m.28s.
Helwan eZ =71m.33s. and 72m.20s.
College iP? =75m.24s., eL =107m.28s.
Berkeley eN =94m.6s., eE =94m.30s., eZ =95m.0s.
Granada SS =100m.14s., SSS =106m.21s., L =125m.0s.
Sitka e =102m.30s., eL =102m.45s.
Seattle eL =108m.0s.
Palisades e =108m.29s.
Long waves were also recorded at Almeria, Wellington, and Seattle.

March 17d. 15h. 47m. 40s. Epicentre 0·°5S. 128°·0E. (as on 1949, Sept. 19d.).

$A = -·6157$, $B = +·7880$, $C = -·0087$; $\delta = +11$; $h = +7$;
$D = +·788$, $E = +·616$; $G = +·005$, $H = -·007$, $K = -1·000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		16·5	335	e 3 56	+ 2	e 6 52	− 6	—	—	—
Bandong		21·3	253	e 4 41	− 9	i 8 31	−12	—	—	—
Djakarta		21·9	255	e 4 42	−15	i 8 36	−18	—	—	—
Nanking		33·5	346	6 45	+ 2	e 11 59	− 6	—	—	—
Riverview		39·6	149	e 7 44	+ 9	i 13 45	+ 7	e 16 34	SS	e 21·2
Vladivostok		43·6	5	e 8 13	+ 5	i 14 38	0	—	—	—
Colombo	E.	48·6	280	8 40	− 7	14 15	PS	—	—	26·3
Kodaikanal	E.	51·4	284	—	—	e 16 5	PS	—	—	—
Kabansk		55·4	345	e 9 42	+ 4	—	—	—	—	—
Irkutsk		56·2	343	e 9 56	+12	—	—	—	—	—
New Delhi		56·5	306	e 9 38	− 8	i 17 20	−17	—	—	—
Bombay		57·5	293	e 9 20?	−33	e 17 33	−17	—	—	—
Christchurch		58·4	144	—	—	e 18 5	+ 3	e 27 35	Q	e 32·1
Naryn		62·8	319	e 10 36	+ 6	—	—	—	—	—
Almata II		62·8	321	e 10 24	− 6	—	—	—	—	—
Almata		63·1	321	10 34	+ 2	18 57	− 5	—	—	—
Rybach'e		63·2	320	e 10 33	+ 1	—	—	—	—	—
Ili		63·3	322	i 10 27	− 6	—	—	—	—	—
Khorog		64·2	313	e 10 38	− 1	—	—	—	—	—
Frunse		64·4	319	e 10 49?	+ 9	e 19 16?	− 2	—	—	—
Andijan		65·0	316	e 10 40	− 4	19 13	−13	—	—	—
Fergana		65·2	316	e 10 41	− 4	e 19 12	−16	—	—	—
Tashkent		67·3	316	e 10 56	− 3	e 19 42	−12	—	—	—
Tchimkent		67·5	317	e 11 7?	+ 7	—	—	—	—	—
Sverdlovsk		78·2	329	e 12 3	0	e 21 46	−11	—	—	—
Abastumanj		86·7	312	e 12 46	− 1	—	—	—	—	—
College		88·0	25	e 12 51	− 2	e 29 56	SS	e 16 27	PP	—
Ksara		92·0	303	e 15 30	?	25 22	PS	—	—	—
Helwan	z.	96·0	300	—	—	e 26 6	PS	—	—	—
Collmberg	z.	105·8	323	18 44	PP	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hungry Horse		108·6	38	e 18 20	[−10]	—	—	—	—	—
Stuttgart	Z.	109·0	322	e 18 59?	PP	—	—	—	—	—
Tamanrasset	Z.	119·9	296	e 18 54	[+ 1]	—	—	e 20 10	PP	—
Seven Falls	E.	130·7	16	e 22 37	PKS	—	—	(25 27)	?	25·4
Shawinigan Falls	N.	130·7	18	e 22 34	PKS	—	—	—	—	—
Harvard		134·6	20	e 22 48	PKS	—	—	—	—	e 74·3

Additional readings :—
Christchurch eSSS?EN =26m.15s.
Stuttgart eZ =19m.3s. and 19m.14s.
Long waves were also recorded at Auckland, Wellington, Granada, Pavia, and Berkeley.

March 17d. Readings also at 1h. (Collmberg, near Istanbul, and near Malaga), 2h. (Puebla, Vera Cruz, Tacubaya, and near Hungry Horse), 3h. (Apia (2), College (2), Riverside, China Lake, Overton, and Tucson), 4h. (Collmberg and Manila), 5h. (Fergana, Tchimkent, Samarkand, near Khorog, Kulyab, College (4), Tucson, Seven Falls, Riverview, Wellington, Christchurch (2), and Auckland), 8h. (College, China Lake, and Tucson), 9h. (College and Santa Lucia), 11h. (Ashkabad, Messina, and Rome), 12h. (Hungry Horse, and Kodaikanal), 13h. (Overton), 14h. (near Klyuchi), 16h. (near Istanbul), 17h. (near Alicante (4)), 18h. (Gandzha, Leninakan, near Abastumanj, Akhalkalaki, Tiflis, Tsikhlis-Dzhvari, and near Istanbul), 19h. (Collmberg, Gandzha, near Akhalkalaki, Tsikhlis-Dzhvari, Tinemaha, China Lake, Mount Wilson, College, and near Huancayo), 20h. (Gandzha, near Akhalkalaki, and Tsikhlis-Dzhvari), 21h. (Apia), 22h. (Victoria (4), and near Klyuchi), 23h. (College, Victoria, Hungry Horse, San Juan, Bandong, Djakarta, Manila, Nanking, near Almata II, and near Klyuchi).

March 18d. 9h. 18m. 16s. Epicentre 9°·5N. 126°·7E. (as on 1947, Jan. 8d.).

A = −·5895, B = +·7909, C = +·1640 ; δ = −7 ; h = +7 ;
D = +·802, E = +·598 ; G = −·098, H = +·131, K = −·986.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		7·5	313	e 1 58	+ 5	e 3 23	+ 3	—	—	—
Korror		8·0	105	1 57	− 3	—	—	—	—	—
Guam		18·1	75	4 17	+ 3	—	—	—	—	—
Nanking		23·6	343	i 5 14a	+ 1	i 9 34	+ 9	i 5 38	pP	e 10·6
Bandong		25·0	232	e 5 33	+ 6	e 10 15	+26	—	—	—
Djakarta		25·2	234	i 5 32k	+ 3	i 10 11	+19	—	—	—
Vladivostok		33·8	9	e 6 41	− 5	e 12 8	− 2	—	—	—
Brisbane	Z.	44·8	146	i 8 16	− 1	—	—	—	—	—
Kabansk		45·5	343	8 23	0	15 3	− 2	—	—	—
Colombo	E.	46·4	270	8 31	+ 1	15 19	+ 1	—	—	28·7
Irkutsk		46·4	341	e 8 30	0	e 15 17	− 1	—	—	—
Kodaikanal	E.	48·5	276	e 8 41	− 5	—	—	—	—	—
Poona		51·9	286	i 9 12	0	i 16 36	+ 1	10 16	PcP	—
Bombay		52·9	287	e 9 22	+ 2	e 16 56	+ 8	—	—	—
Almata		54·7	318	e 9 13	−20	e 17 10	− 3	—	—	—
Khorog		56·7	309	e 9 51	+ 3	—	—	—	—	—
Andijan		57·1	313	e 9 51	+ 1	e 17 42	− 3	—	—	—
Fergana		57·4	313	e 9 49	− 4	—	—	—	—	—
Stalinabad		59·2	310	10 3	− 2	—	—	—	—	—
Tashkent		59·5	314	i 10 6	− 1	i 18 10	− 6	—	—	—
Tchimkent		59·5	315	e 10 6	− 1	—	—	—	—	—
College		79·5	26	e 12 9	− 1	—	—	—	—	—
Ksara		85·5	303	—	—	22 44	[−20]	—	—	—
Helwan	Z.	90·0	300	e 13 4	+ 1	e 14 49	?	—	—	—
Resolute Bay		92·2	11	e 13 13	0	e 24 19	+ 5	e 17 28	PP	—
Hungry Horse		101·5	37	e 13 57	+ 2	—	—	—	—	—

Additional readings :—
Nanking iPPZ =5m.48s., iPPPN =6m.1s.
Poona PPEZ =11m.16s., PSEZ =16m.45s., PPSEZ =17m.1s., ScSEZ =19m.2s.
College i =12m.23s., eP =18m.2s., e =22m.12s.
Helwan eZ =13m.38s.
Resolute Bay eE =24m.39s., eN =28m.16s.
Long waves were also recorded at Apia, Wellington, Chinchina, Kew, Paris, Strasbourg and Stuttgart.

March 18d. 9h. 24m. 31s. Epicentre 40°·0N. 42°·0E. (given by U.S.S.R.).

$A = +\cdot5709$, $B = +\cdot5140$, $C = +\cdot6402$; $\delta = -2$; $h = -2$;
$D = +\cdot669$, $E = -\cdot743$; $G = +\cdot476$, $H = +\cdot428$, $K = -\cdot768$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Leninakan		1·6	60	e 0 29	− 1	—	—	—	—
Abastumanj		1·9	19	0 33	− 1	1 1	+ 2	—	—
Gandzha		1·9	44	0 34	0	1 1	+ 2	—	—
Erevan		1·9	85	i 0 37	+ 3	1 6	S_g	—	—
Tsikhlis-Dzhvari		2·0	32	0 37	+ 2	1 9	S_g	—	—
Tiflis		2·7	51	e 0 46	+ 1	i 1 30	S_g	0 53	P_g
Kirovobad		3·4	76	e 0 59	+ 4	i 1 56	S_g	—	—
Piatigorsk		4·1	11	i 1 20	P_g	i 1 55	0	e 2 14	S_g
Grozny		4·3	39	e 1 20	P^*	i 2 26	S_g	—	—
Lenkoran		5·4	101	1 46	P_g	2 59	S_g	—	—
Yalta		7·3	310	e 1 51	+ 1	—	—	i 2 23	P_g
Ksara		7·9	220	e 1 59	0	4 17	S_g	—	—
Istanbul	z.	9·9	280	e 2 30	+ 5	e 5 25	S_g	—	—
Moscow		16·0	351	e 3 45	− 3	—	—	—	—
Sverdlovsk		20·8	29	e 4 47	+ 2	e 8 37	+ 4	—	—
Pulkovo		21·1	344	e 4 47	− 1	e 8 31	− 8	—	—
Prague		21·8	307	e 4 59	+ 3	—	—	—	—
Collmberg	z.	23·1	308	e 5 10	+ 2	—	—	—	—
Stuttgart		24·9	302	e 5 23	− 3	(e 9 47)	0	—	—
Zürich		25·1	299	e 5 26	− 2	—	—	—	—
Tamanrasset	z.	35·2	252	e 6 55	− 3	—	—	—	—

Additional readings :—
Tiflis S^* = 1m.26s.
Prague iP = 5m.2s., e = 5m.16s. and 5m.36s.
Stuttgart iPZ = 5m.27s., S is given as PP.
Tamanrasset eZ = 7m.14s.

March 18d. 11h. 32m. 27s. Epicentre 46°·2N. 26°·6E. (given by U.S.S.R.).

$A = +\cdot6211$, $B = +\cdot3110$, $C = +\cdot7194$; $\delta = +2$; $h = -4$;
$D = +\cdot448$, $E = -\cdot894$; $G = +\cdot643$, $H = +\cdot322$, $K = -\cdot695$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kishinev		1·7	62	0 38	P_g	1 3	S_g	—	—	—
Bucharest		1·8	191	e 0 30	− 2	i 0 51	− 5	i 0 36	S_g	—
Cernauti		2·1	348	e 0 46	P_g	i 1 17	S_g	—	—	—
Timisoara		3·8	266	e 1 3	+ 2	e 1 47	0	e 1 13?	P_g	—
Uzhgorod		3·8	312	i 1 6	+ 5	—	—	—	—	—
Lwow		4·0	336	e 1 10	P^*	i 1 54	+ 2	e 1 17	P_g	—
Belgrade		4·5	255	e 1 22k	P^*	e 1 57	− 8	e 1 33	P_g	e 2·4
Istanbul	z.	5·4	160	i 1 19	− 5	i 1 49	P_g	—	—	—
Yalta		5·6	105	1 22	− 5	2 24	− 9	—	—	—
Prague		9·0	300	e 2 13	0	e 3 47	−11	e 4 51	S_g	e 6·2
Collmberg	z.	10·3	305	e 2 31	− 1	—	—	—	—	—
Moscow		11·8	32	e 2 50	− 3	e 4 56	−10	—	—	—
Stuttgart	z.	12·1	289	e 2 53	− 4	—	—	—	—	—
Pulkovo		13·8	8	e 3 21	+ 2	—	—	—	—	—
College		69·2	358	e 10 58	−12	—	—	—	—	—
Hungry Horse		79·8	335	i 11 57	−15	—	—	—	—	—

Additional readings :—
Timisoara eP*EN = 1m.9s., eS*E = 2m.0s.
Belgrade eZ = 1m.40s.
Prague e = 3m.4s.

March 18d. Readings also at 0h. (College, New Delhi, Almata, Almata II, Ili, Kulyab, near Andijan, Fergana, Frunse, Khorog, Lunacharskoe, Naryn, Rybach'e, Samarkand, Stalinabad, Tashkent, Leninakan, near Abastumanj, Akhalkalaki, Tiflis, and Tsikhlis-Dzhvari), 1h. (College and Apia), 2h. (near Chatra), 3h. (Toledo, near Alicante, Almeria, Malaga, and near Granada), 5h. (College), 6h. (Riverside, China Lake, Tucson, and College), 7h. (near Messina), 8h. (near Alicante (4)), 9h. (Chatra, China Lake, Tucson, Hungry Horse, near Sofia, and Yalta), 10h. (Chatra, near Andijan, near Akhalkalaki, Gandhza, and Tsikhlis-Dzhvari), 11h. (Hungry Horse and near Alicante (2)), 12h. (Pasadena, China Lake, Tinemaha, Shasta Dam, Hungry Horse (2), and College (2)), 13h. (College), 15h. (Basle, Apia, Almata II, Ili, Krasnogorka, near Almata, and Chilisk), 17h. (Santa Clara and near Akhalkalaki), 18h. (Scoresby Sund), 19h. (Hungry Horse), 20h. (Auckland, near Klyuchi, and near Manila), 21h. (near Balboa Heights, near Abastumanj, Akhalkalaki, Gandzha, Tiflis, and Tsikhlis-Dzhvari), 22h. (Wellington and College).

March 19d. 3h. 7m. 28s. Epicentre 35°·3N. 34°·9W. (as on 1942, March 30d.).

$A = +\cdot6708$, $B = -\cdot4680$, $C = +\cdot5752$; $\delta = -15$; $h = 0$;
$D = -\cdot572$, $E = -\cdot820$; $G = +\cdot472$, $H = -\cdot329$, $K = -\cdot818$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Granada		25·3	75	(i 5 29 a)	− 1	(i 9 44)	−10	(5 59)	PP	(11·9)
Almeria		26·2	77	(5 33)	− 5	(9 53)	−16	(9 9)	PcP	(14·0)
Tortosa		28·3	67	—	—	(e 11 32?)	SS	—	—	e 11·5
Weston		29·1	296	e 5 57	− 7	—	—	—	—	—
Seven Falls	E.	29·2	306	e 6 4	− 1	—	—	—	—	13·5
Harvard		29·3	296	e 6 4	− 2	—	—	e 13 30	Q	e 15·5
Kew		29·5	45	—	—	(e 12 32?)	SS	—	—	e 12·5
Palisades		31·0	293	—	—	(e 13 17)	SS	—	—	e 13·3
San Juan		32·4	247	e 6 32	− 2	—	—	—	—	e 15·2
Stuttgart		34·9	53	e 6 57	+ 2	—	—	—	—	e 16·3
Rome		37·2	64	—	—	e 13 10	+ 8	—	—	—
Tamanrasset	Z.	37·2	97	e 7 16	+ 1	—	—	e 8 53	PP	18·5
Columbia		37·7	283	e 5 40	?	(e 15 55)	SS	—	—	e 15·9
Messina		40·1	69	e 13 32	PcS	—	—	—	—	—
Resolute Bay	Z.	48·5	343	e 8 45	− 1	e 15 53	PS	e 10 10	PcP	—
Hungry Horse		57·9	310	e 9 53	− 3	—	—	—	—	—
Logan		58·7	302	e 9 59	− 3	—	—	—	—	—
La Paz		60·4	216	10 14	+ 1	—	—	—	—	—
Tucson		61·7	291	e 10 29	+ 7	—	—	—	—	—
Pierce Ferry		62·4	297	e 10 26	− 1	—	—	—	—	—
Boulder City		63·1	297	e 10 33	+ 1	—	—	—	—	—
Tinemaha	Z.	65·1	298	e 10 48	+ 3	—	—	—	—	—
China Lake	Z.	65·2	298	e 10 48	+ 3	—	—	—	—	—
Riverside	Z.	65·8	295	e 10 50	+ 1	—	—	—	—	—
Mount Wilson	Z.	66·2	295	e 10 51	− 1	—	—	—	—	—
Shasta Dam		66·4	304	e 10 53	0	—	—	—	—	—
College		67·4	335	e 11 0	+ 1	—	—	e 11 28	PcP	e 34·0
Lick	Z.	67·4	301	e 11 1k	+ 2	—	—	e 11 42	?	—

Additional readings :—
Granada readings have been reduced by 1 minute.
Almeria PP = (6m.9s.), readings have been reduced by 1 minute.
Tamanrasset eZ = 7m.48s.
Long waves were also recorded at Paris, Strasbourg, and Pavia.

March 19d. 9h. 29m. 33s. Epicentre 21°·8S. 33°·9E.

Intensity IV at Massangena ; II-III at Mavita, Mambone, Vilanculos, and Vila Manica. Epicentre 21°·2S. 33°·2E. (Strasbourg).

Observaçoes macrossismicas (1951), Anuario sismologico de Portugal, No. 5, 1951, p.6.

$A = +·7713$, $B = +·5183$, $C = -·3693$; $\delta = -8$; $h = +4$;
$D = +·558$, $E = -·830$; $G = -·306$, $H = -·206$, $K = -·929$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pretoria	z.	6·5	232	i 1 38	− 1	i 2 46	− 9	—	—	—
Johannesburg		6·9	230	e 1 45	0	i 2 58	− 7	e 2 11	P_g	i 3·6
Pietermaritzburg	z.	8·4	201	i 2 10	+ 4	i 3 42	− 1	—	—	—
Kimberley		10·8	228	i 2 36	− 3	i 4 31	−11	—	—	—
Grahamstown	z.	13·2	208	i 3 13	+ 2	i 5 39	− 1	—	—	—
Tananarive		13·2	79	3 21	+10	i 5 39	− 1	i 6 4	SS	8·4
Helwan		51·4	358	e 9 7	− 2	e 16 29	+ 1	e 13 27	?	—
Tamanrasset	z.	52·2	327	i 9 13a	− 2	e 20 18	SS	—	—	26·4
Colombo	E.	53·3	63	9 29	+ 6	15 47	−67	—	—	26·4
Kodaikanal	E.	53·3	57	e 4 24	?	—	—	—	—	—
Ksara		55·3	3	e 9 39	+ 1	e 17 27	+ 6	—	—	—
Bombay		55·6	46	9 44	+ 4	—	—	—	—	18·5
Poona		56·0	47	e 9 44	+ 1	—	—	—	—	—
Messina	E.	62·1	344	—	—	e 18 50	+ 1	e 22 49	SS	e 34·4
Istanbul	z.	62·7	356	e 10 34	+ 5	—	—	—	—	—
Kirovobad		63·3	11	e 10 32	− 1	19 6	+ 2	—	—	—
Baku		63·6	13	—	—	e 19 11	+ 3	—	—	—
Algiers Univ.	z.	65·1	333	e 10 44	− 1	—	—	—	—	—
Yalta		66·0	0	e 10 43	− 7	19 34	− 4	—	—	—
Rome		66·4	343	—	—	e 19 45	+ 2	—	—	—
Almeria		67·7	330	e 11 1	0	e 20 4	+ 6	—	—	34·2
Alicante		68·0	332	10 54	− 9	18 53	?	25 39	Q	e 31·3
Stalinabad		68·4	29	e 11 6	0	—	—	—	—	—
Granada		68·5	329	11 12	+ 6	i 20 9	+ 1	—	—	32·6
Chatra		70·7	50	e 11 20	0	—	—	—	—	e 40·0
Tashkent		70·9	27	i 11 21	0	e 21 27	ScS	e 25 27	SS	—
Toledo		70·9	330	e 11 6	−15	e 20 38	+ 2	e 13 42	PP	e 38·4
Fergana		71·2	30	e 11 24	+ 1	—	—	—	—	—
Andijan		71·8	30	—	—	e 20 50	+ 4	—	—	—
Tchimkent		71·8	27	i 11 27	+ 1	—	—	—	—	—
Stuttgart		73·6	344	e 11 37a	0	e 21 10	+ 3	—	—	e 39·4
Strasbourg		73·9	343	—	—	e 21 18	+ 8	—	—	e 37·4
Collmberg	z.	75·1	348	e 11 46	0	—	—	—	—	—
Paris		75·7	340	i 11 49	0	—	—	i 12 0	PcP	e 41·4
Moscow		77·3	3	e 12 0	+ 2	—	—	—	—	—
Kew		78·9	340	—	—	e 22 12	+ 7	—	—	e 42·4
Pulkovo		81·3	359	e 12 21	+ 1	e 22 32	+ 2	—	—	—
Sverdlovsk		81·5	14	12 21	0	22 32	0	—	—	—
La Paz		94·7	250	13 35	+11	24 15	[+16]	—	—	—
Vladivostok		110·3	50	e 28 37	PS	e 25 11	[− 2]	—	—	—
College		136·9	2	e 19 29	[+ 4]	—	—	e 22 9	PP	—
Hungry Horse		143·2	324	e 19 35	[− 1]	e 23 19	PKS	—	—	—
Logan		145·0	313	e 19 38	[− 1]	—	—	—	—	—
Tucson		147·0	297	e 19 48	[+ 5]	—	—	i 20 32	?	e 77·3
Victoria	z.	147·8	331	e 19 50	[+ 6]	—	—	—	—	—
Seattle		147·9	329	e 19 51k?	[+ 7]	—	—	—	—	—
Pierce Ferry		148·7	305	e 19 50	[+ 5]	—	—	i 19 53	PKP_2	—
Boulder City		149·4	305	e 19 54	[+ 8]	—	—	—	—	—
China Lake	z.	151·5	307	e 19 56	[+ 6]	—	—	i 20 1	PKP_2	—
Tinemaha	z.	151·5	309	e 19 56	[+ 6]	—	—	i 20 0	PKP_2	—
Palomar		151·7	301	i 20 0	[+10]	—	—	i 20 10	PKP_2	—
Riverside	z.	152·0	303	e 19 59	[+ 9]	—	—	—	—	—
Pasadena	z.	152·5	303	e 20 1	[+10]	—	—	—	—	—
Shasta Dam		152·5	319	e 19 56	[+ 5]	—	—	—	—	—
Fresno	z.	152·8	310	e 19 57k	[+ 5]	—	—	e 23 4	PKS	—
Lick	z.	153·8	313	e 20 4k	[+11]	—	—	e 20 20	PKP_2	—

For Notes see next page.

NOTES TO MARCH 19d. 9h. 29m. 33s.

Additional readings :—
Tananarive PP = 3m.37s., iS = 5m.52s., Q = 7m.21s.
Tamanrasset ePPZ = 9m.59s., eZ = 11m.46s. and 24m.8s.
Bombay e = 8m.3s., eSN = 14m.38s., eSE = 14m.45s., QN = 18m.8s.
Toledo e = 12m.27s.
Seattle e = 20m.7s., 20m.13s., and 21m.19s.
Pierce Ferry i = 20m.10s.
Lick eZ = 22m.39s.
Long waves were also recorded at De Bilt, Palisades, Tortosa, Pavia, Triest, and La Plata.

March 19d. 20h. 28m. 52s. Epicentre 55°·7N. 160°·4E.

J.S.A. gives epicentre as adopted.

$A = -\cdot5333$, $B = +\cdot1899$, $C = +\cdot8243$; $\delta = -6$; $h = -7$;
$D = +\cdot335$, $E = +\cdot942$; $G = -\cdot777$, $H = +\cdot277$, $K = -\cdot566$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		0·6	18	i 0 12	P_g	i 0 19	S_g	—	—	—
Yuzno-Sakhlinsk		14·1	239	3 30	+ 7	7 14	?	—	—	—
Vladivostok		22·2	247	c 5 3	+ 3	i 9 8	+ 8	—	—	—
College		26·5	48	i 5 39	− 2	e 10 8	− 6	e 9 4	PcP	e 11·4
Kabansk		31·2	286	6 27	+ 4	—	—	—	—	—
Irkutsk		32·4	289	e 6 36	+ 2	—	—	—	—	—
Sitka		34·4	60	e 6 47	− 4	e 12 29	+10	i 8 9	PP	e 14·3
Zi-ka-wei	z.	36·7	245	e 8 44	PP	e 15 58	SSS	—	—	—
Nanking		37·4	250	8 54	PP	16 9	SSS	e 13 5	PcS	20·6
Resolute Bay		40·9	23	i 7 42	− 4	e 13 51	− 7	e 9 22	PP	—
Victoria		45·1	66	i 8 19k	− 1	(18 38)	SS	—	—	18·6
Seattle		46·2	66	i 8 30k	+ 2	e 15 23?	+ 8	e 10 2	PP	e 27·1
Hungry Horse		50·0	60	i 8 57	− 1	—	—	i 10 18	PcP	—
Sverdlovsk		50·5	316	e 9 4	+ 2	16 17?	+1	—	—	—
Shasta Dam		50·9	73	i 9 5	0	—	—	—	—	—
Mineral	z.	51·6	73	i 9 10k	0	—	—	—	—	—
Almata II		52·2	295	i 9 16	+ 1	—	—	—	—	—
Almata		52·4	295	9 18	+ 2	16 49	+ 7	—	—	—
Berkeley		53·0	75	i 9 21k	0	e 17 10	PPS	e 20 50	SS	e 22·9
Bozeman		53·3	61	e 9 19	− 4	e 16 53	− 1	—	—	e 23·8
Rybach'e		53·4	295	i 9 25	+ 1	e 17 3	+ 8	—	—	—
Lick	z.	53·7	75	i 9 26k	0	—	—	i 11 18	PP	—
Frunse		53·9	296	i 9 30	+ 3	e 17 10	+ 8	—	—	—
Scoresby Sund		54·1	2	e 9 28	− 1	e 17 11	+ 6	—	—	26·1
Naryn		54·2	294	e 9 31	+ 2	—	—	—	—	—
Fresno	z.	55·2	74	i 9 36k	− 1	—	—	e 12 5	PP	—
Logan		55·7	65	e 9 40	0	—	—	e 11 7	PcP	e 25·5
Tinemaha		55·8	73	i 9 41k	0	—	—	—	—	—
Salt Lake City		56·4	66	e 14 44	ScP	—	—	—	—	e 27·1
Andijan		56·6	295	i 9 48	+ 1	i 17 43	+ 5	—	—	—
Tchimkent		56·9	299	i 9 49	0	i 17 46	+ 4	—	—	—
China Lake		57·0	73	i 9 50k	0	e 17 46	+ 3	—	—	—
Fergana		57·2	295	e 9 51	0	e 17 52	+ 6	—	—	—
Tashkent		57·7	298	i 9 58?	+ 3	e 17 55?	+ 2	—	—	—
Pasadena		58·0	75	i 9 56k	− 1	—	—	e 39 46	P'P'	—
Pulkovo		58·2	333	e 9 58	0	e 18 0	+ 1	—	—	—
Rapid City	E.	58·3	57	i 10 5	+ 6	—	—	e 12 14	PP	e 27·8
Boulder City		58·4	71	i 10 0	0	—	—	—	—	—
Riverside	z.	58·5	75	i 9 59k	− 1	—	—	e 39 45	P'P'	—
Pierce Ferry		58·7	71	i 10 2	0	e 18 9	+ 3	i 10 37	PcP	—
Chatra	z.	58·9	273	e 10 4	+ 1	e 18 6	− 2	—	—	—
Helsinki		59·2	337	e 10 4	− 1	e 18 9	− 3	—	—	e 30·1
Palomar		59·3	75	i 10 5	− 1	—	—	—	—	—
Moscow		59·6	328	e 10 8	0	e 18 21	+ 4	—	—	—
Kulyab		60·0	295	e 10 11	0	e 18 31	+ 8	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Samarkand		60·1	298	e 10 13?	+ 2	—	—	—	—	—
Stalinabad		60·1	296	i 10 11	0	i 18 29	+ 5	—	—	—
Upsala		61·0	341	i 10 17	− 1	i 18 33	− 2	e 11 1	PcP	e 30·1
Calcutta	E.	61·6	270	—	—	e 18 56	PS	—	—	—
New Delhi		63·2	283	e 10 31	− 1	e 19 1	− 2	—	—	—
Tucson		63·4	71	i 10 33	− 1	—	—	—	—	e 35·1
Lincoln	E.	63·8	56	—	—	e 23 23	SS	—	—	e 29·0
Mary		64·3	200	10 41	+ 2	e 19 21	+ 4	—	—	—
Ashkabad		65·7	303	10 51	+ 3	19 40	+ 6	—	—	—
Copenhagen		65·9	342	i 10 50	0	i 19 39	+ 2	—	—	34·1
Baku		67·6	310	e 11 9?	+ 8	e 20 9?	+12	—	—	—
Shemakla		68·0	311	10 42?	−21	19 45?	−17	—	—	—
Florissant		68·4	53	e 11 4	− 2	—	—	—	—	—
St. Louis		68·6	53	e 11 4	− 3	e 20 8	− 1	—	—	—
Lwow		68·7	332	e 11 7	0	e 20 12	+ 2	—	—	—
Ottawa		68·7	39	11 4	− 3	—	—	—	—	36·1
Tiflis		68·7	315	e 11 9	+ 2	—	—	—	—	—
Shawinigan Falls	N.	68·8	36	e 11 4	− 4	—	—	—	—	—
Kirovobad		68·9	312	11 10	+ 1	i 20 19	+ 6	—	—	—
Seven Falls	E.	68·9	35	—	—	e 20 15	+ 2	—	—	34·1
Lenkoran		69·4	310	11 14	+ 2	—	—	—	—	—
Abastumanj		69·5	316	e 11 11	− 1	—	—	—	—	—
Cleveland		69·9	45	e 11 13k	− 2	e 20 28	+ 4	e 28 15	SSS	—
Leninakan		69·9	315	e 11 18	+ 3	—	—	—	—	—
Collmberg	Z.	70·0	339	e 11 14	− 1	—	—	e 13 33	PP	—
Raciborzu	Z.	70·0	336	10 36	−39	—	—	e 11 0	P	—
Erevan		70·1	313	e 11 24	+ 8	—	—	—	—	—
Skalnate Pleso		70·3	334	e 11 17?	0	e 20 35	+ 6	14 20	PP	—
Yalta		70·4	323	e 11 20	+ 2	e 20 32?	+ 2	—	—	—
Jena		70·6	340	e 11 20	+ 1	e 20 34	+ 1	—	—	—
Rathfarnham Castle		70·8	352	i 11 20	0	—	—	—	—	e 33·1
Prague		70·9	338	e 11 19a	− 2	e 20 39	+ 3	e 21 3	PS	—
Cheb		71·3	340	e 13 5	?	e 20 58	+17	e 21 29	PPS	—
Hyderabad	N.	71·3	274	—	—	e 20 44	+ 3	—	—	—
Kew		72·0	348	—	—	e 20 54	+ 5	—	—	e 41·1
Morgantown		72·1	45	i 11 27	− 1	—	—	e 13 35	PP	—
Budapest		72·2	334	11 33	+ 4	—	—	e 16 13	PPP	e 40·6
Weston		72·9	38	i 11 32	− 1	—	—	e 28 38	SSS	e 37·3
Poona		73·0	278	11 47	PcP	20 56	− 4	16 9	PPP	31·4
Karlsruhe	Z.	73·1	342	e 11 36	+ 2	—	—	—	—	—
Stuttgart		73·1	341	e 11 34	0	e 21 4	+ 3	e 11 45	PcP	e 40·1
Palisades		73·2	40	i 11 28	− 7	—	—	—	—	—
Bombay	E.	73·3	280	e 11 35	0	i 21 3	− 1	21 40	PS	—
Strasbourg		73·6	342	e 11 37	0	e 21 8	+ 1	e 16 29	PPP	e 33·1
Paris		74·2	346	i 11 40	0	e 21 12	− 2	i 14 23	PP	e 43·1
Belgrade		74·3	332	e 11 41k	0	e 21 19	+ 4	e 26 13	SS	e 47·1
Basle		74·6	342	e 11 44	+ 1	—	—	—	—	—
Zürich		74·6	342	e 11 42k	− 1	—	—	—	—	—
Istanbul	Z.	75·1	325	e 11 50	+ 4	—	—	—	—	—
Besançon		75·2	343	e 11 46	0	—	—	e 11 55	PcP	—
Triest		75·2	337	e 11 45	− 1	i 21 26	+ 1	e 26 23	SS	e 36·1
Neuchatel		75·3	343	e 11 46	− 1	—	—	—	—	—
Columbia		76·5	49	—	—	e 22 26	PPS	—	—	e 38·5
Padova		76·7	338	e 12 46	+51	—	—	—	—	—
Prato		77·4	338	e 12 4	+ 6	e 21 52	+ 3	—	—	—
Florence		77·5	338	e 12 1	+ 2	e 22 33	PS	e 12 23	?	—
Rome		79·0	337	e 12 8	+ 1	e 22 6	0	27 11	SS	e 38·1
Ksara		79·1	316	12 10	+ 2	e 22 29	ScS	—	—	—
Taranto		79·2	333	—	—	22 13	+ 5	—	—	—
Tacubaya		79·9	70	i 12 19a	+ 7	e 22 15	− 1	i 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.
Messina		81·8	333	e 12 18	− 4	e 22 30	− 5	—	—	38·3
Helwan		84·3	318	12 36	+ 1	e 22 58	− 2	15 56	PP	—
Alicante		84·9	346	12 37	− 1	22 24	−42	32 50	Q	e 38·2
Granada		86·5	348	i 12 50k	+ 4	i 23 32	+10	—	—	44·6
Almeria		86·7	347	i 12 49	+ 2	23 3	[− 9]	23 20	ScS	46·6
Malaga		87·0	348	i 12 48	0	—	—	i 16 20	PP	38·2
San Juan		96·4	45	i 13 32	0	e 35 38	SSS	e 19 21	PPP	e 39·4
Tamanrasset	z.	98·9	337	e 13 42	− 1	—	—	i 17 39	PP	49·1

Additional readings :—
College i =6m.10s., iPP =6m.29s.
Sitka e =7m.32s., 7m.49s., and 13m.28s.
Resolute Bay eEZ =9m.13s., e =9m.49s., eEN =10m.27s., 14m.3s., 14m.32s., and 16m.51s.
Seattle i =8m.37s., 8m.47s., 8m.53s., and 9m.13s.
Mineral iZ =9m.23s. and 9m.38s.
Berkeley eZ =9m.38s.
Lick iZ =9m.33s. and 10m.31s.
Tinemaha iZ =9m.51s. and 9m.59s.
Pasadena iZ =10m.6s.
Rapid City eE =13m.34s.
Palomar iZ =10m.16s.
Upsala iN =10m.25s., e =10m.54s., ePPE =12m.27s., eN =14m.37s. and 17m.1s., eE =18m.53s., eSSSE =25m.19s.
Tucson i =10m.48s.
Cleveland eN =12m.51s.
Skalnate Pleso e =11m.28s., eSS =25m.24s.
Jena eE =11m.29s., eS?N =20m.16s.?.
Rathfarnham Castle iZ =11m.28s.
Prague i =11m.29s., e =11m.48s., 12m.30s., and 13m.48s., ePP =14m.18s.
Cheb eN =14m.6s.
Budapest PE =11m.36s., eE =13m.8s.?, eN =15m.13s.
Poona ePEZ =11m.54s., PPE =14m.25s., SKSE =21m.10s., ScSE =21m.33s., PPSE =21m.42s., SSE =25m.40s., SSSE =28m.45s.
Bombay eSN =20m.52s., PSN =21m.29s.
Strasbourg e =12m.17s. and 12m.36s.
Paris i =11m.52s., iPcP? =12m.9s., i =13m.38s., 14m.54s., and 17m.38s., ePS =21m.34s.
Belgrade eNE =14m.13s.
Besançon e =12m.10s. and 12m.48s.
Triest iScS =21m.34s.
Rome e =23m.6s., SSS =29m.38s.
Alicante PP =15m.27s., SS =27m.12s., SSS =30m.34s.
Almeria PP =15m.57s., PPP =17m.54s., PS =24m.4s.
Malaga i =19m.34s.
San Juan ePP? =16m.59s., eS =22m.59s., eSS =30m.22s.
Tamanrasset eZ =16m.51s., ePPPZ =19m.26s., eZ =20m.31s., ePKKP =30m.11s.
Long waves were also recorded at Pavia, De Bilt, and Saskatoon.

March 19d. Readings also at 0h. (Wellington), 1h. (near Sofia), 3h. (near Ashkabad), 4h. (near Granada), 5h. (Apia and Sofia), 6h. (College, Hungry Horse, Stalinabad, near Khorog, Kulyab, and near Andijan), 7h. (College, Hungry Horse, Tucson, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Shasta Dam, Pierce Ferry, Lick, Fresno, Santa Lucia, Victoria, Chatra, and Bombay), 10h. (Weston, and Kodaikanal), 11h. (near Apia), 12h. (near Klyuchi), 14h. (College, Hungry Horse, Shasta Dam, Almata II, Chilisk, Ili, Krasnogorka, Przhevalsk, near Andijan, Fergana, Frunse, Naryn, Rybach'e, Tashkent, and Tchimkent), 15h. (Apia, Brisbane, College, near Klyuchi and near Khorog), 16h. (Collmberg, Hungry Horse, and near Khorog), 17h. (Apia), 19h. (Chatra and Tucson), 20h. (College, Hungry Horse, Pasadena, China Lake, Tinemaha, Tacubaya, Palisades, and near Klyuchi), 21h. (Boulder City), 23h. (near Victoria).

March 20d. Readings also at 0h. (Huancayo, La Paz, Bogota, La Plata, Pasadena, Palomar, China Lake, Tinemaha, Boulder City, Pierce Ferry (2), Berkeley, Collmberg (2), and Ksara), 1h. (Ksara), 2h. (Apia), 3h. (Shasta Dam), 4h. (Gandzha, near Akhalkalaki, and Tsikhlis-Dzhvari), 6h. (Chatra, Bombay, Pretoria, and College), 8h. (Tchimkent, Stalinabad, Almata II, Przhevalsk, Ili, Samarkand, Almata, near Andijan, Fergana, Naryn, Khorog, Rybach'e, Frunse, Kulyab, Tashkent, and near Klyuchi), 9h. (College, Pierce Ferry, and near Santa Clara), 11h. (Prague), 12h. (Tacubaya), 15h. (Scoresby Sund and Tucson), 16h. (near Akhalkalaki), 17h. and 18h. (Pretoria), 19h. (College and Hungry Horse), 20h. (Huancayo, Pasadena, Riverside, Palomar, China Lake, Tinemaha, Boulder City, Pierce Ferry, Shasta Dam, and Tucson), 21h. (Chatra and College), 23h. (Ksara).

March 21d. Readings at 0h. (Pretoria and Collmberg), 2h. (College and near Klyuchi (2)), 4h. (Antofagasta), 5h. (Palomar, China Lake, Tucson, and near Khorog), 6h. (Hungry Horse, Boulder City, and Pierce Ferry), 10h. (College), 11h. (Sofia, Prague, near Collmberg, and near Chinchina), 13h. (Hungry Horse, Tamanrasset, Ksara, Timisoara, Belgrade, Prague, Collmberg, Stuttgart, and near Athens), 14h. (Tamanrasset, Manila, Mineral, Pasadena, Riverside, Palomar, China Lake, Tinemaha, Shasta Dam, Boulder City, Pierce Ferry, Tucson, and near Gandzha), 16h. (College, Hungry Horse, Shasta Dam, Mineral, Fresno, Mount Wilson, Palomar, China Lake, Tinemaha, Boulder City, Pierce Ferry, Tucson, Weston, Granada, Collmberg, Pretoria, near Ashkabad, near Antofagasta, and Copiapo), 17h., (Manila, near Djakarta, and Bandong), 18h. (College, Hungry Horse (2), Shasta Dam, Piecre Ferry, and Palisades), 19h. (Kew, College, and Manila), 20h. (near Balboa Heights), 21h. (Pierce Ferry, Manila, Nanking, Puebla, Tacubaya, near Vladivostok, and near Stalinabad), 23h. (College, Mary, Tchimkent, Naryn, Almata II, Frunse, Rybach'e, near Khorog, Fergana, Andijan, Samarkand, Lunacharskoe, Tashkent, and Stalinabad).

March 22d. 10h. 31m. 50s. Epicentre 36°·0S. 54°·0E.

A = +·4766, B = +·6560, C = −·5852 ; δ = −6 ; h = 0 ;
D = +·809, E = −·588 ; G = −·344, H = −·473, K = −·811.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tananarive		18·0	339	4 7	− 6	e 7 30	− 2	e 7 15	?	—
Pietermaritzburg	z.	20·8	282	i 4 48	+ 3	—	—	—	—	—
Grahamstown	z.	22·7	269	i 5 13	+ 9	—	—	—	—	—
Pretoria	z.	24·3	288	i 5 25	+ 5	—	—	—	—	—
Bombay		57·4	21	—	—	e 17 47	− 2	—	—	—
Poona		57·4	23	e 9 49	− 4	—	—	—	—	—
Helwan		68·9	339	e 16 27	?	e 20 10	− 3	—	—	—
Ksara		71·5	344	e 11 30	+ 6	e 20 42	− 1	—	—	—
Tamanrasset	z.	74·3	314	e 11 43	+ 2	—	—	e 14 33	PP	35·2
Stalinabad		75·4	12	i 11 48	+ 1	e 21 26	− 1	—	—	—
Samarkand		76·3	10	e 12 0	+ 8	—	—	—	—	—
Fergana		77·8	14	e 11 59	− 2	—	—	—	—	—
Andijan		78·2	14	e 12 3	0	e 21 55	− 2	—	—	—
Tashkent		78·2	12	e 12 5	+ 2	e 21 57	0	—	—	—
Algiers Univ.	z.	86·5	321	12 56	PcP	—	—	—	—	—
Sverdlovsk		92·6	4	e 13 18	+ 3	24 16	− 2	—	—	—
Stuttgart	z.	93·3	332	e 13 20	+ 2	—	—	—	—	—
Strasbourg		93·7	332	e 13 24	+ 4	—	—	—	—	—
College		148·3	18	e 19 51	[+ 6]	—	—	e 20 43	?	—
Hungry Horse		164·8	330	e 20 5	[− 1]	—	—	i 21 5	PKP_2	—
Tucson		166·1	260	e 20 18	[+11]	—	—	—	—	—
Palomar	z.	172·0	—	i 21 50	PKP_2	—	—	i 25 44	PP	—
China Lake	z.	173·2	—	e 20 21	[+10]	—	—	—	—	—
Pasadena	z.	173·3	—	e 25 42	PP	—	—	—	—	—
Tinemaha	z.	173·7	—	e 20 29	[+18]	—	—	—	—	—
Mineral	z.	174·4	—	e 20 23k	[+12]	—	—	e 21 54	PKP_2	—

Tamanrasset gives also eZ = 12m.30s.
Long waves were also recorded at Wellington, Paris, Alicante, and Granada.

March 22d. 15h. 13m. 58s. Epicentre 48°·2N. 9°·0E. (as on 1949, Dec. 25d.).

Intensity IV-V in the neighbourhood of the epicentre.
Macroseismic radius ca.7km. Epicentre 48°14′·0N. 9°00′·5E. Depth 3-5km.

Monthly seismological bulletin, Stuttgart.

A = +·6609, B = +·1046, C = +·7432 ; δ = +8 ; h = −5 ;
D = +·156, E = −·988 : G = +·734, H = +·116, K = −·670.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Ebingen		0·0	—	e 0 2	P*	i 0 3	S*	—	—
Stuttgart	z.	0·6	13	e 0 11?	P_g	i 0 19	S_g	e 0 13	P*
Ravensburg		0·6	135	0 14?	− 1	0 27	+ 1	—	—
Strasbourg		0·9	295	e 0 16?	P_g	e 0 31	S*	e 0 25	?
Zürich		0·9	198	e 0 18	P_g	e 0 31	S*	—	—
Collmberg	z.	4·0	38	—	—	e 2 5	S*	—	—

Stuttgart gives also eS_gZ = 18s., iZ = 22s., eZ = 30s.

March 22d. 19h. 36m. 49s. Epicentre 12°·9S. 172°·7W. (as on 1950, Oct. 30d.).

Intensity II-III at Apia. Epicentre 13°S. 172°·5W. (U.S.C.G.S.).
Apia seismological bulletin, first quarter of 1951.

$A = -·9672$, $B = -·1239$, $C = -·2218$; $\delta = +2$; $h = +7$;
$D = -·127$, $E = +·992$: $G = +·220$, $H = +·028$, $K = -·975$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		1·3	135	i 0 25	0	i 0 43	− 1	—	—	—
Brisbane	z.	35·1	240	i 6 28k	−29	—	—	—	—	—
Berkeley	z.	69·2	41	i 11 12a	+ 2	—	—	—	—	—
Lick	z.	69·2	41	i 11 13k	+ 3	—	—	i 11 40	PcP	—
Pasadena	z.	69·8	46	i 11 15k	+ 1	—	—	—	—	—
Fresno		70·1	43	e 11 17k	+ 1	—	—	—	—	—
Palomar		70·3	47	i 11 17k	0	—	—	—	—	—
Riverside	z.	70·3	46	i 11 17k	0	—	—	—	—	—
Shasta Dam		70·8	38	i 11 20	0	—	—	—	—	—
Mineral	z.	71·0	39	e 11 22k	0	—	—	i 11 26	P	—
China Lake		71·1	45	i 11 22k	0	—	—	—	—	—
Tinemaha	z.	71·3	43	i 11 25k	+ 2	—	—	—	—	—
Boulder City		73·1	56	i 11 34	0	—	—	—	—	—
Pierce Ferry		73·7	47	i 11 37	− 1	—	—	—	—	—
Tucson		74·2	51	i 11 41	+ 1	—	—	—	—	—
Logan		78·0	42	e 12 2	0	—	—	—	—	—
College		79·8	11	i 12 12	0	—	—	i 12 24	PcP	—
Hungry Horse		80·0	36	e 12 10	− 3	—	—	—	—	—
La Paz		99·9	109	13 53	+ 5	—	—	—	—	—
Collmberg	z.	141·4	354	e 19 24	[− 9]	—	—	—	—	—
Prague		142·5	353	e 19 29	[− 6]	—	—	e 22 22	PP	—
Paris		144·0	6	e 19 33	[− 4]	—	—	—	—	e 77·2
Stuttgart	z.	144·2	358	e 19 30	[− 8]	—	—	e 19 45	PKP_2	—
Strasbourg		144·4	359	e 19 31	[− 7]	—	—	e 19 45	PKP_2	—
Zürich		145·6	359	e 19 33	[− 7]	—	—	—	—	—
Besançon		145·7	1	e 19 36	[− 4]	—	—	e 19 51	PKP_2	—
Ksara		146·7	314	i 19 39	[− 3]	—	—	e 22 59	PP	—
Tamanrasset	z.	170·0	—	i 20 1k	[− 8]	—	—	e 21 27	PKP_2	—

Additional readings :—
Lick iZ = 11m.25s.
Prague e = 19m.40s., 19m.55s., 20m.26s., 20m.45s., 21m.9s., and 21m.16s.
Paris i = 19m.45s. and 19m.49s.
Besançon e = 20m.40s.
Tamanrasset eZ = 20m.14s., ePPZ = 25m.21s.
Long waves were also recorded at Wellington and Granada.

March 22d. Readings also at 0h. (Collmberg), 1h. (Collmberg and Akhalkalaki), 2h. (Tchimkent, Kizyl-Arvat, Ashkabad, near Mary, and near Copiapo), 3h. (near Copiapo and near Ashkabad (6)), 4h. (College, Mineral, Pasadena, Riverside, Palomar, China Lake, Boulder City, Pierce Ferry, and Tucson), 5h. (Hungry Horse, Stuttgart (2), Collmberg, Jena, Prague, and Santa Lucia), 6h. (College, near Khorog, and near Istanbul), 8h. (Tucson, Tamanrasset, Ashkabad, and near Klyuchi), 10h. (Istanbul), 11h. (near Prague and Collmberg), 12h. (near Istanbul (2) and Yalta), 13h. (Khorog, Tchimkent, Frunse, Rybach'e, near Andijan, Fergana, Naryn, and near Klyuchi), 14h. (College, near Prague, and near Klyuchi (3)), 15h. (Ashkabad and near Klyuchi (3)), 16h. (Collmberg, Apia, Yuzno-Sakhlinsk, Vera Cruz, near Oaxaca, Puebla, Tacubaya, and near Klyuchi), 17h. (Kew and Pretoria), 18h. (College), 21h. (College and Ashkabad), 22h. (Klyuchi and near Petropavlovsk).

March 23d. 21h. 38m. 55s. Epicentre 31°·8S. 179°·5E. Depth of focus 0·040.
(as on 1948, April 20d.).

$A = -\cdot8515$, $B = +\cdot0074$, $C = -\cdot5244$; $\delta = +10$; $h = +2$;
$D = +\cdot009$, $E = +1\cdot000$; $G = +\cdot524$, $H = -\cdot005$, $K = -\cdot852$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	6·4	216	i 1 37	+ 3	e 2 47	− 1	i 14 45	ScS	—
Tuai	N.	7·2	205	e 1 43	− 1	3 6	0	—	—	—
Wellington		10·2	200	e 2 16	− 6	4 10	− 3	14 46	ScS	—
Cobb River	E.	10·7	208	e 2 28	0	e 4 29	+ 5	—	—	—
Kaimata	N.E.	12·5	209	e 2 50	0	e 5 5	+ 1	14 53	ScS	—
Christchurch		12·9	203	e 3 4	+ 9	e 5 14	+ 1	—	—	—
Apia		19·6	28	i 4 0	− 8	i 7 12	−17	—	—	—
Brisbane		23·4	273	i 4 50k	+ 5	i 8 53	+19	i 5 37	pP	i 11·9
Riverview		23·9	257	i 4 49k	− 1	i 9 3	+20	i 5 42	pP	i 11·2
Perth		53·3	252	i 10 3	PcP	i 16 13	+13	—	—	i 26·4
Honolulu		57·1	26	e 9 12	− 7	—	—	—	—	e 24·8
Bandong		71·0	274	e 10 57	+ 9	i 19 54	+14	—	—	—
Djakarta		72·0	274	e 11 3	+ 9	i 19 58	+ 7	—	—	—
Manila		72·6	300	e 11 0	+ 2	e 19 52	− 6	i 11 52	pP	—
Punta Arenas	N.	75·7	144	—	—	e 20 36	+ 4	—	—	—
Zi-ka-wei	Z.	83·4	313	i 11 57	+ 1	e 21 57	+ 5	i 12 55	pP	—
Yuzno-Sakhlinsk		85·1	335	13 3	pP	—	—	—	—	—
Nanking		85·6	312	e 12 7	0	22 12	− 1	i 13 5	pP	—
Vladivostok		86·3	327	i 12 12	+ 1	22 13	− 7	22 3	SKS	—
Petropavlovsk		86·5	347	e 12 13	+ 1	22 13	− 9	13 14	pP	—
Santa Clara		87·9	43	i 12 18	0	i 22 39	+ 4	—	—	—
Berkeley		88·0	43	i 12 16k	− 3	e 22 43	+ 8	e 15 37	PP	e 41·9
Lick	Z.	88·0	43	i 12 17k	− 2	—	—	i 13 52	sP	—
Pasadena		88·0	47	i 12 16	− 3	e 22 24	[+ 6]	i 13 11	pP	e 35·4
Palomar		88·3	49	i 12 14k	− 6	i 22 26	[+ 6]	—	—	—
Riverside		88·4	47	i 12 17	− 4	i 15 53	PP	i 13 12	pP	—
Ukiah		88·4	41	e 12 23	+ 2	e 22 45	+ 6	e 13 36	sP	e 35·9
Fresno	Z.	88·7	44	e 12 19k	− 3	—	—	e 13 49	sP	—
Klyuchi		89·2	350	12 22	− 2	—	—	—	—	—
China Lake		89·4	46	i 12 22a	− 3	i 30 2	PKKP	i 13 17	pP	—
Shasta Dam		89·9	40	i 12 24	− 4	e 23 0	+ 7	e 22 32	SKS	—
Tinemaha		89·9	46	i 12 24	− 4	e 23 0	+ 7	e 22 37	SKS	—
Mineral	Z.	90·1	41	e 12 24a	− 5	—	—	—	—	—
Guadalajara		90·4	67	e 13 45	pP	e 22 53	− 4	—	—	—
Boulder City		91·3	48	i 12 31	− 3	e 23 16	+11	e 22 46	SKS	—
Tucson		91·6	53	i 12 34	− 2	e 23 18	+10	e 13 30	pP	e 41·8
Pierce Ferry		91·9	48	i 12 34	− 3	i 23 19	+ 9	i 13 43	pP	—
Tacubaya		93·0	70	e 12 46	+ 4	e 23 26	+ 6	e 24 36	SP	—
Oaxaca		93·6	73	—	—	e 23 25	0	e 24 55	SP	—
Puebla		93·6	70	—	—	e 23 23	− 2	e 24 59	SP	—
La Plata		94·5	137	14 41	?	24 11	+38	16 41	PP	39·2
Seattle		94·8	36	i 12 51k	+ 1	22 48	[− 8]	i 13 32	pP	—
Victoria		94·8	35	12 47	− 3	i 23 45	+10	23 3	SKS	—
Vera Cruz		95·3	71	—	—	e 23 36	− 4	e 25 40	sS	—
Salt Lake City		96·1	46	e 13 16?	+20	e 23 55	+ 9	e 16 43	PP	e 39·4
Huancayo		96·3	109	e 12 58	+ 1	i 23 17	[+13]	e 13 56	pP	—
Sitka		96·3	23	e 16 45	PP	e 23 57	+ 9	e 22 57	SKS	e 39·6
Logan		96·7	45	e 12 57	− 2	e 23 40	−11	e 14 25	sP	e 39·6
Butte		98·8	41	—	—	e 23 22	[+ 5]	e 26 8	PS	e 39·5
Hungry Horse		99·4	39	i 13 7	− 4	e 23 22	[+ 2]	e 17 2	PP	—
La Paz		99·4	117	i 13 9k	− 2	i 23 25	[+ 5]	17 21	PP	—
Bozeman		99·5	42	e 13 7	− 5	e 24 24	+ 9	e 17 12	PP	e 40·6
College		99·7	13	e 13 8	− 4	i 24 23	+ 6	i 14 12	pP	e 40·2
Colombo	E.	101·8	271	e 14 24	+62	23 41	[+ 9]	—	—	32·2
Calcutta	E.	102·5	290	e 17 46	PP	24 50	+10	20 1	PPP	47·1
Rapid City	E.	103·2	47	e 17 11	PP	e 23 42	[+ 3]	e 19 20	PPP	e 39·4
Chinchina		105·2	94	i 19 15	PP	i 25 17	+15	i 23 55	SKS	e 43·1
Chatra		105·5	293	e 17 50	PP	e 25 15	+10	e 23 57	SKS	—
Kodaikanal	E.	105·5	274	e 14 32	pP	—	—	—	—	—
Saskatoon		105·5	38	i 17 59	PP	i 27 10	PS	—	—	32·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Irkutsk		106·3	322	e 17 57	PP	24 59	−12	19 6	pPP	—
Bogota		106·4	95	e 18 20	PP	e 24 50	S	e 25 28	SKKS	48·1
Hyderabad	E.	108·2	280	e 18 24	PP	—	—	—	—	—
St. Louis		109·2	56	i 18 22	PP	i 25 42	S	e 27 51	sS	—
Grahamstown	Z.	110·4	205	i 17 30	[−28]	e 28 59	PS	i 29 10	PPS	—
Chicago		112·4	54	e 18 38	PP	e 25 16	SKKS	e 26 10	S	e 43·0
Poona		112·6	279	18 3	[+ 1]	24 23	[+ 5]	18 40	PP	—
Bombay		113·6	279	e 18 51	PP	25 36	S	22 14	PPP	—
New Delhi		114·2	291	e 18 6	[+ 1]	e 24 28	[+ 3]	20 29	pPP	—
Cleveland		116·5	56	i 18 9	[− 1]	e 24 40	[+ 7]	i 19 17	pPKP	e 50·1
Pretoria	Z.	116·6	211	i 18 12	[+ 2]	—	—	—	—	—
Buffalo		118·8	55	i 19 34	pPKP	e 24 50	[+ 9]	e 26 25	S	—
Pennsylvania		118·9	58	i 19 35	PP	i 24 48	[+ 6]	i 35 37	SS	—
Resolute Bay		119·2	18	i 18 12	[− 3]	e 24 48	[+ 5]	e 19 34	PP	—
Almata II		119·3	306	i 18 17	[+ 2]	—	—	—	—	—
Almata		119·6	306	i 18 18	[+ 3]	—	—	—	—	—
Naryn		119·7	303	e 18 17	[+ 2]	—	—	—	—	—
Rybach'e		119·9	304	e 18 18	[+ 3]	—	—	—	—	—
San Juan		119·9	86	i 18 16	[+ 1]	e 24 51	[+ 6]	e 19 16	pPKP	e 48·4
Philadelphia		120·6	60	—	—	e 24 54	[+ 7]	e 29 35	PS	e 50·6
Krasnogorka		120·8	305	i 19 23	pPKP	—	—	—	—	—
Frunse		121·1	304	e 18 20	[+ 1]	25 0	[+11]	i 19 22	pPKP	—
Khorog		121·7	297	e 18 24	[+ 4]	—	—	—	—	—
Ottawa		121·7	53	e 18 19	[− 1]	e 29 37	PS	e 19 39	pPKP	—
Fordham		121·8	59	e 18 18	[− 2]	e 29 50	PS	20 55	PP	—
Palisades		121·8	59	e 18 19	[− 1]	i 24 56	[+ 5]	i 26 29	SKKS	e 51·9
Andijan		122·1	301	18 22	[+ 1]	—	—	—	—	—
Fergana		122·4	301	e 18 22	[+ 1]	e 21 47	PKS	e 19 25	pPKP	—
Fort de France		122·4	93	e 18 20	[− 1]	e 35 55	SS	e 31 0	PPS	—
Weston		124·0	58	i 18 23	[− 1]	e 36 37	SS	—	—	e 52·2
Stalinabad		124·2	299	i 18 27	[+ 2]	i 29 41	PS	i 19 27	pPKP	—
Lunacharskoe		124·5	302	e 18 31	[+ 6]	—	—	—	—	—
Tashkent		124·5	302	i 18 27	[+ 2]	24 6	[−54]	i 19 27	pPKP	—
Tchimkent		124·5	303	i 18 27	[+ 2]	—	—	—	—	—
Seven Falls	E.	125·4	52	18 26	[− 1]	25 9	[+ 6]	20 16	PP	50·1
Samarkand		125·8	299	e 18 31	[+ 3]	—	—	—	—	—
Mary		129·2	296	i 18 38	[+ 4]	—	—	e 19 36	pPKP	—
Sverdlovsk		131·6	321	i 18 28	[−11]	i 22 7	PKS	i 19 39	pPKP	—
Ashkabad		132·0	295	18 43	[+ 3]	22 11	PKS	—	—	—
Kizyl-Arvat		133·8	297	e 18 48	[+ 5]	—	—	—	—	—
Ivigtut		137·4	32	—	—	22 22	PKS	—	—	—
Baku		138·9	297	e 18 53	[+ 1]	—	—	—	—	—
Lenkoran		139·5	295	18 49	[− 4]	—	—	19 47	pPKP	—
Scoresby Sund		139·5	12	e 18 45	[− 8]	i 22 9	PKS	i 21 45	PP	—
Kirovobad		141·6	297	e 18 55	[− 3]	—	—	—	—	—
Grozny		142·0	302	18 58	[0]	—	—	—	—	—
Tiflis		142·8	300	e 19 0	[0]	—	—	—	—	—
Erevan		143·0	297	e 19 0	[0]	—	—	—	—	—
Leninakan		143·5	299	e 19 4	[+ 3]	—	—	—	—	—
Borzhomi		143·8	299	e 19 4	[+ 3]	—	—	—	—	—
Piatigorsk		143·9	304	i 19 5	[+ 4]	—	—	—	—	—
Abastumanj		144·2	299	e 19 0	[− 2]	—	—	—	—	—
Moscow		144·2	324	i 19 1	[− 1]	e 22 15	PKS	i 20 0	pPKP	—
Reykjavik	Z.	145·0	17	i 19 3	[0]	i 22 23	PKS	i 19 9	PKP_2	—
Pulkovo		145·3	333	i 19 3	[− 1]	i 22 25	PKS	i 20 3	pPKP	—
Sotchi		146·4	304	e 19 12	[+ 6]	—	—	—	—	—
Helsinki		147·0	339	e 19 8	[+ 1]	e 20 36	sPKP	e 20 11	pPKP	—
Theodosia		149·2	307	e 19 9	[− 1]	—	—	—	—	—
Ksara		149·5	283	i 19 13k	[+ 3]	36 7	PPS	—	—	—
Upsala		149·5	343	i 19 16	[+ 6]	e 22 48	PKS	i 20 30	pPKP	61·1
Yalta		150·2	306	19 14	[+ 3]	—	—	i 20 15	pPKP	—
Helwan		152·6	274	19 13	[− 2]	32 27	PSKS	20 17	pPKP	—
Kishinev		152·9	316	i 19 19	[+ 4]	—	—	—	—	—
Lwow		154·3	322	i 19 18	[+ 1]	i 19 43	PKP_2	i 20 18	pPKP	—
Copenhagen		154·4	344	i 19 19	[+ 2]	34 50	PS	23 17	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Istanbul	z.	154·6	300	e 19 16	[− 2]	—	—	e 19 41 PKP_2	—
Skalnate Pleso		156·7	325	e 19 24	[+ 4]	e 43 5	SS	e 20 36 pPKP	—
Raciborzu	z.	157·0	330	i 19 23	[+ 2]	—	—	e 19 53? PKP_2	—
Collmberg	z.	158·1	338	e 19 23	[+ 1]	e 23 37	PP	i 19 57 PKP_2	—
Rathfarnham Castle		158·1	9	i 19 27	[+ 5]	e 24 55?	[−63]	i 19 58 PKP_2	e 61·1
Ogyalla		158·6	325	e 20 44	pPKP	e 28 11	SKKS	e 20 13 PKP_2	—
Prague		158·6	334	e 19 25a	[+ 2]	e 25 58	[0]	e 20 45 pPKP	e 63·1
Jena		158·9	338	e 19 21	[− 2]	e 29 35	PKKP	e 20 1 pPKP	—
Belgrade		159·1	314	e 19 26	[+ 3]	e 26 27	[+28]	e 28 3 SKKS	e 43·2
Vienna		159·2	327	i 19 25	[+ 1]	e 23 53	PP	e 20 25 PKP_2	—
De Bilt		159·3	351	e 19 25	[+ 1]	e 43 35	SS	e 20 5 PKP_2	—
Cheb		159·4	338	e 20 39	pPKP	e 26 25	[+26]	e 21 44 $pPKP_2$	—
Kew		160·3	0	i 19 27	[+ 2]	e 34 1	PSKS	i 20 8 PKP_2	e 49·1
Stuttgart		161·5	339	e 19 25	[− 1]	e 30 28	SKKS	i 20 13 pPKP	e 50·1
Karlsruhe	z.	161·6	343	e 19 26	[0]	—	—	i 20 29 pPKP	—
Strasbourg		162·1	342	e 19 28a	[+ 2]	e 31 12	SKKS	i 20 15 pPKP	e 68·1
Triest		162·3	327	i 19 29	[+ 2]	i 26 5	[+ 3]	i 20 20 PKP_2	—
Paris		162·9	355	i 19 29	[+ 2]	i 26 5	[+ 3]	i 20 18 pPKP	e 85·1
Zürich		163·0	341	e 19 28a	[+ 1]	i 24 2	PP	e 20 18 PKP_2	—
Basle		163·1	342	e 19 39	[+12]	—	—	e 20 19 PKP_2	—
Chur		163·1	336	e 19 27	[0]	—	—	e 20 20 PKP_2	—
Taranto		163·7	307	19 31	[+ 3]	44 27	SS	24 27 PP	76·0
Besançon		163·8	344	i 19 31	[+ 3]	i 24 8	PP	e 20 18 pPKP	—
Neuchatel		163·8	341	e 19 29	[+ 1]	—	—	e 20 23 PKP_2	—
Salo		163·8	332	e 19 32	[+ 4]	e 23 22	PKS	e 20 27 pPKP	—
Padova		164·0	327	19 33	[+ 5]	26 30	[+27]	20 28 pPKP	—
Bologna		164·3	328	e 19 35	[+ 6]	e 25 56	[− 7]	e 20 38 PKP_2	—
Pavia		164·7	333	e 19 30	[+ 1]	e 30 27	PKKP	e 20 28 pPKP	—
Florence		164·9	326	e 19 33	[+ 4]	—	—	e 20 33 PKP_2	—
Prato		164·9	326	e 19 31	[+ 2]	e 32 13	?	— —	—
Messina		165·4	300	i 19 29	[− 1]	e 34 37	PSKS	i 20 33 pPKP	—
Rome		165·5	318	19 30	[0]	34 37	PSKS	i 20 31 PKP_2	e 73·6
Clermont-Ferrand		165·8	350	i 24 0	PP	e 30 26	SKKS	e 27 56 PPP	—
Tamanrasset	z.	169·6	212	i 19 35a	[+ 3]	e 30 59	SKKS	i 20 32 pPKP	—
Lisbon		170·1	43	19 35k	[+ 2]	36 30	PS	i 20 36 pPKP	74·5
Tortosa		171·0	335	19 34	[+ 1]	31 37	SKKS	20 54 PKP_2	—
Toledo		171·4	18	i 19 35	[+ 2]	e 27 34	?	i 24 48 PP	78·9
Alicante		173·5	0	19 37	[+ 2]	25 39	[−29]	20 59 PKP_2	e 78·8
Granada		174·1	24	19 37k	[+ 2]	26 27	[+19]	19 50 pPKP	76·3
Malaga		174·1	32	i 19 38	[+ 3]	—	—	i 24 52 PP	—
Algiers Univ.	z.	174·2	331	e 19 35	[0]	e 31 34	SKKS	e 20 35 pPKP	—
Almeria		174·7	17	i 19 34	[− 1]	39 35	PPS	i 25 0 PP	77·1

Additional readings :—
Brisbane isSZ = 10m.1s., iSSE = 10m.17s.
Riverview iEZ = 5m.5s., iPPEZ = 5m.50s., iE = 6m.5s., iN = 6m.26s., iEZ = 6m.36s., iZ = 9m.9s., iNZ = 9m.34s., iE = 10m.3s., isSEN = 10m.22s., iSSN = 10m.34s., iE = 10m.45s.
Perth i = 11m.58s. and 17m.30s.
Zi-ka-wei iZ = 13m.26s. and 23m.58s.
Nanking iZ = 12m.12s., isP? = 13m.30s., i = 13m.45s., isS? = 23m.57s.
Vladivostok ScS = 22m.30s.
Petropavlovsk ScS = 22m.5s., PS = 23m.56s.
Berkeley iZ = 12m.32s., eZ = 13m.48s. and 16m.37s., eSKSEN = 22m.22s., ePSZ = 24m.0s., eN = 35m.47s., eE = 35m.59s.
Pasadena iZ = 12m.37s., isPZ = 13m.49s., eZ = 15m.14s., iPPZ = 15m.46s., iEN = 22m.42s.
Riverside iZ = 13m.17s., isPZ = 13m.53s.
Ukiah eSKS = 22m.21s., esS = 24m.5s., eSS = 28m.41s.
Fresno iZ = 12m.22s., eE = 14m.35s.
China Lake isP = 13m.49s., iEN = 22m.33s., eE = 22m.55s., iN = 23m.7s., ePKP,PKPZ = 38m.14s., eSKP,PKPZ = 41m.22s.
Shasta Dam esS = 24m.29s.
Mineral iZ = 12m.38s. and 13m.36s.
Boulder City iPKKP = 29m.59s., eSKP,PKP = 41m.26s.
Tucson esP = 13m.55s., ePP = 16m.10s., esPP = 17m.27s., ePPP? = 18m.26s., eSKS = 22m.45s., isS = 24m.25s., ePS = 24m.47s., ePKKP = 29m.58s., eSSS = 33m.16s., ePKP,PKP = 38m.9s.

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Pierce Ferry eSKS =22m.48s., ePS =25m.1s., iPKKP =29m.57s.
Oaxaca e =29m.21s., iSS =29m.37s.
Puebla e =24m.12s.
La Plata PPSN =22m.59s., N =24m.47s., SSS?N =29m.11s., SSSE =29m.41s., QN = 33m.41s.
Seattle isP? =13m.51s., eSP =24m.48s., eSS =30m.10s. and many other unidentified readings.
Victoria e =24m.41s.
Vera Cruz e =24m.2s. and 24m.38s.
Salt Lake City eSKS =22m.35s., epS =24m.54s., ePS =25m.35s., eSS =30m.23s.
Huancayo e =23m.10s., eSP =25m.4s., eSS =30m.29s.,
Sitka iSKS =23m.10s., esS =25m.33s., iPS =25m.39s., iPPS =26m.49s.
Logan ePP =16m.52s., eSKS =23m.5s., iSKKS? =23m.17s., epS =24m.53s., eSS = 30m.25s.
Butte eSS =30m.41s.
Hungry Horse ePKKP =29m.35s., ePKP,PKP =37m.33s.
La Paz iPKS =21m.10s., i =25m.47s., PS =26m.15s., iPPS =27m.5s., iSS =31m.15s.
Bozeman eSKS =23m.29s., iPS =26m.17s., eSS =31m.7s.
College i =13m.33s., ePP =17m.11s., i =17m.24s., iSKS =23m.23s., epP =25m.24s., iPS =26m.20s., iPPS =27m.31s., iPKKP =29m.32s., eSS? =30m.51s., esSS = 32m.34s., ePKP,PKP =37m.52s., ePKP,PKP,PKP =58m.44s.
Calcutta iSKSE =23m.49s., iPSE =26m.37s., PKKPE =29m.10s., SSE =31m.49s., SSSE =35m.50s.
Rapid City ePSE =26m.34s., eSS?E =32m.11s.
Irkutsk esS =26m.44s.
Bogota ePPSEN =28m.32s.
St. Louis i =20m.5s., e =25m.5s., 26m.51s., and 27m.16s.
Chicago ePS =28m.21s., eSS =34m.4s., eSSS =38m.6s.
Poona PPPE =20m.52s., PKSE =21m.23s., SKS_2E =24m.57s., SKKSE =25m.19s., SKKKSE =25m.26s., PSE =27m.46s., PPSE =28m.52s.
Bombay PPPE =22m.18s., SKSN =25m.39s., SSE =35m.34s., SSSN =39m.52s.
New Delhi iN =25m.31s., SKSN =26m.27s., eN =28m.13s., iPSN =29m.59s., iPPSN = 31m.14s., iN =34m.49s., SSN =36m.25s., iN =42m.41s.
Cleveland esSKSE =26m.22s., ePSE =27m.8s., ePPSE =30m.16s., eSSN =35m.4s.
Buffalo 27m.53s. and 29m.21s.
Pennsylvania iE =26m.31s., eN =27m.9s. and 27m.47s., iE =29m.26s., eE =30m.26s., ePKP,PKP?N =39m.4s.
Resolute Bay eEN =26m.29s. and 29m.22s.
San Juan i =21m.32s., iS =27m.17s., ipS =27m.56s., iPS =29m.15s., iPPS =30m.21s., eSS? =36m.5s., eSSS? =40m.29s.
Philadelphia iSS =35m.56s.
Frunse ePS =29m.20s.
Ottawa i =26m.24s. and 27m.35s., e =30m.49s.
Palisades i =28m.8s., iPS =29m.50s., i =36m.18s. and 39m.21s.
Fergana PS =29m.39s.
Stalinabad ePP =20m.2s., i =28m.1s.
Tashkent iPP =19m.58s., iPS =29m.44s.
Seven Falls eE =21m.43s., PPPE =22m.58s., SKKSE =26m.50s., eE =28m.35s., PSE = 30m.16s., PPSE =31m.26s., eE =33m.13s., SSE =37m.17s.
Sverdlovsk iPP =20m.52s., ipPP =21m.44s., iPPP =23m.29s., eSS =38m.17s.
Scoresby Sund e =18m.54s., iZ =18m.57s., epPP =23m.6s.
Reykjavik iZ =20m.30s.
Helsinki ePPZ =22m.35s.
Upsala iN =19m.20s., $iPKP_2N$ =19m.36s., $ipPKP_2$ =20m.45s., e =21m.53s., eN = 23m.35s., eE =23m.39s., i =24m.22s., eN =27m.5s.? and 31m.51s., eE =34m.20s.
Helwan eZ =21m.47s., PPZ =22m.29s., eN =34m.11s. and 38m.25s.
Copenhagen 45m.29s.
Skalnate Pleso $ePKP_2$ =20m.13s., esPKP =21m.8s., ePPE =23m.40s., eSSS =49m.29s. and other unidentified e readings.
Collmberg eZ =20m.59s.
Rathfarnham Castle iZ =20m.58s., eZ =21m.20s., iZ =21m.41s., eZ =23m.37s., ePPPEN =27m.25s., e =30m.5s., eEN =39m.5s., eSSEN =42m.56s., eSSSEN = 49m.20s.
Ogyalla eN =20m.6s., eE =20m.30s., e =21m.2s., esPKP? =21m.10s., eE =21m.18s., $epPKP_2$?E =21m.40s., eE =21m.53s., $esPKP_2$?E =22m.5s., eE =22m.16s., 22m.35s., and 23m.16s.
Prague $ePKP_2$ =20m.13s., esPKP =21m.8s., $epPKP_2$ =21m.36s., $esPKP_2$ =22m.6s., ePP =23m.35s. and 23m.50s., epPP =25m.10s., esPP =25m.34s., epSKS =27m.43s., esSKS =28m.13s., eSKKS =29m.28s., ePSKS =33m.39s., epPS =36m.27s., eSPP = 36m.52s., eSS =43m.11s., esSS =45m.5s., eSSS =49m.41s. and several unidentified readings.
Jena eN =19m.29s., ipPKPN =20m.6s., eN =20m.35s. and 20m.53s., ePPZ =23m.41s., eN =35m.17s. and 37m.25s.
Belgrade iZ =20m.5s., eZ =21m.11s., eNW =34m.41s.
Vienna i =20m.7s.
De Bilt ePP =23m.41s., eZ =25m.5s.
Cheb ePP =23m.54s., eSKS? =28m.12s., eSKSP =33m.18s. and other unidentified phases.

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Kew ePP =23m.49s., eSS =35m.27s., eSSP =37m.19s., eEN =45m.6s.
Stuttgart iPKPZ =19m.29s., iPP =23m.57s., ePPS =37m.23s. and 38m.23s., eSS =44m.5s. and other unidentified phases.
Strasbourg ePP =23m.54s., ePPP =27m.52s., ePPS =37m.36s., eSS =44m.5s., eSSS = 51m.5s. and several unidentified readings.
Triest ePPZ =24m.4s., iSS =44m.5s., iSSS =50m.54s.?.
Paris iPKP$_2$ =20m.30s.?, ipPKP$_2$ =21m.37s., iPP =24m.3s., ipPP =25m.5s., isPP = 25m.23s., iPPP =27m.54s., eSKKS =30m.22s., epPS =36m.35s., iPPS =37m.43s., iSS? =43m.15s., iSSS =50m.5s. and other unidentified readings.
Basle e =21m.14s.
Taranto e =33m.27s.
Besançon i =19m.36s., iPKP$_2$ =20m.22s., ipPKP$_2$ =21m.15s., esPP =25m.26s., e = 27m.35s., ePPP =27m.58s.
Salo ePKP$_2$N =20m.36s., eN =32m.7s.
Padova SKP =22m.8s., PSKS =34m.39s.
Bologna e =23m.16s. and 31m.3s.
Pavia e =21m.22s., ePSKS? =35m.4s., e =47m.6s.
Messina ePP =24m.20s., e =30m.43s. and 45m.15s.
Rome iPP =24m.16s., PPP =28m.10s., e =32m.13s., SS =44m.33s., SSS =50m.45s.
Clermont-Ferrand iPP =24m.35s., e =25m.11s., 29m.5s., 34m.31s., and 35m.25s., ePPS =38m.53s., e =39m.53s.
Tamanrasset isPKPZ =20m.55s., ePKP$_2$Z =21m.10s., eZ =23m.31s., ePPZ =24m.33s., epPPZ =25m.40s., eZ =28m.8s., and 28m.41s., eSKKSZ =31m.19s., eZ =32m.19s.
Lisbon PPZ =24m.40s., Z =25m.54s., SSE =45m.24s., E =56m.5s.
Tortosa PPN =24m.43s., SKSPE =36m.33s., SSPE =46m.40s. and 49m.50s.
Toledo i =20m.36s. and 20m.57s., e =31m.14s. and 49m.15s.
Alicante PP =24m.44s., PPP =28m.35s., PPS =38m.16s., SSP =45m.49s., Q =68m.57s.
Granada PKP$_2$ =20m.35s., pPKP$_2$ =20m.50s., sPKP$_2$ =21m.7s., PP =24m.18s., PPP = 28m.29s., SKKS =30m.41s., sSKKS =32m.14s., SKSP =35m.14s., PPS =38m.14s., SS =46m.41s., SSS =51m.38s.
Algiers Univ. ePKP$_2$?Z =21m.9s., ePPZ =24m.59s., eZ =30m.29s.
Almeria PPP =29m.12s., SS =45m.53s., SSP =47m.9s., SSS =52m.54s.

March 23d. Readings also at 0h. (Riverview, Pretoria, Vladivostok, College, China Lake, and near Klyuchi (2)), 1h. (Apia and near Klyuchi), 2h. (Copiapo and near Antofagasta), 3h. (Borzhomi, near Akhalkalaki, Gandzha, Tsikhlis-Dzhvari, and near Klyuchi), 4h. (Ksara), 5h. (Mizusawa, Vladivostok, College, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and Collmberg (2)), 7h. (Apia, Pretoria, and College (2)), 9h. (Palomar, China Lake, Tucson, Berkeley, Lick, Mineral, Shasta Dam, Hungry Horse, College (2), Tamanrasset, Ksara, near La Paz (2), and near Klyuchi), 11h. (Vera Cruz, near Oaxaca, Puebla, and Tacubaya), 12h. (Brisbane), 13h. (College and near Klyuchi (2)), 15h. (near Klyuchi), 16h. (Pretoria), 17h. (near Klyuchi and near Hungry Horse), 19h. (near Klyuchi), 20h. (Apia), 21h. (Pretoria), 22h. (College and near Klyuchi).

March 24d. 0h. 17m. 43s. Epicentre 10°·6S. 165°·5E. Depth of focus 0·020.
(as on 1949, May 6d.).

A = −·9518, B = +·2461, C = −·1828 ; δ = −10 ; h = +6 ;
D = +·250, E = +·968 ; G = +·177, H = −·046, K = −·983.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		20·5	213	i 4 28$_a$	+ 1	i 8 13	+11	i 4 53	pP	—
Apia		22·4	102	i 4 41	− 5	8 39	+ 3	i 5 7	pP	—
Riverview		26·6	208	i 5 27$_a$	+ 2	i 9 53	+ 7	i 5 59	pP	—
Auckland	N.	27·5	164	i 5 31?	− 2	—	—	—	—	—
Tuai	N.	30·0	163	i 5 51	− 5	e 10 34	− 6	—	—	—
Cobb River	E.	31·1	169	e 6 2	− 3	e 11 6	+ 8	—	—	—
Wellington		31·6	167	i 6 7	− 3	i 10 59	− 7	—	—	—
Kaimata	N.E.	32·2	173	6 14	− 1	e 11 17	+ 2	—	—	—
Christchurch		33·4	172	i 6 22	− 3	i 11 30	− 4	i 6 53	pP	e 14·4
Korror		35·7	299	6 49	+ 4	—	—	—	—	—
Perth		50·4	238	—	—	i 15 52	+10	i 16 31	pS	—
Manila		50·7	300	i 9 47	+62	—	—	e 10 56	PP	—
Tokyo		52·1	334	e 8 32	−24	i 16 9	+ 3	i 11 0	PP	e 24·3
Hunatu		52·4	333	e 8 59	+ 1	i 16 13	+ 3	—	—	—
Kumagaya		52·6	334	e 9 1	+ 2	e 16 19	+ 7	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Utunomiya		52·8	335	e 9 1	0	e 16 17	+ 2	—	—	—
Nagoya		52·9	332	e 9 5	+ 3	16 23	+ 7	—	—	—
Maebasi		53·0	334	e 9 28	pP	e 16 36	+18	e 12 28	PPP	—
Gihu		53·2	332	9 9	+ 5	16 19	− 1	i 9 46	pP	—
Osaka		53·2	330	e 9 9	+ 5	e 16 33	+13	e 9 43	pP	—
Sumoto		53·3	329	e 9 7	+ 3	i 16 28	+ 6	—	—	—
Kobe		53·4	330	e 9 43	pP	e 16 30	+ 7	e 10 27	pP	—
Koti		53·4	327	e 9 8	+ 3	e 16 37	+14	e 9 48	pP	—
Hukusima		53·5	336	9 4	− 2	16 26	+ 2	—	—	—
Sendai		53·8	338	e 9 8	0	e 16 34	+ 6	e 12 42	PPP	e 21·5
Bandong		57·2	270	e 9 36	+ 4	e 17 26	+12	—	—	—
Djakarta		58·1	270	e 9 29	−10	i 17 33	+ 8	—	—	—
Zi-ka-wei	z.	59·3	317	9 48	+ 1	i 17 49	+ 8	i 10 25	pP	—
Nanking		61·6	316	i 10 4k	+ 1	i 18 17	+ 7	i 10 41	pP	—
Vladivostok		61·6	333	i 10 4	+ 1	i 18 16	+ 6	i 10 41	pP	—
Petropavlovsk		63·8	355	e 10 17	0	18 40	+ 2	i 10 52	pP	—
Klyuchi		66·8	358	e 10 37	+ 1	19 16	+ 2	i 11 9	pP	—
Kabansk		80·2	328	i 11 55	+ 1	i 21 50	+ 6	12 32	pP	—
Irkutsk		81·6	327	e 12 3	+ 2	22 3	+ 5	12 41	pP	—
Calcutta		82·4	295	i 12 28	+23	i 22 16	+10	—	—	—
Berkeley		82·8	51	i 12 5a	− 2	e 22 7	− 3	e 12 46	pP	—
Santa Clara		82·8	51	i 12 10	+ 3	e 23 23	PS	—	—	—
College		82·9	19	i 12 5	− 3	i 22 9	− 2	i 12 48	pP	—
Lick	z.	83·1	51	i 12 8a	− 1	e 41 52	SKPP′	i 12 49	pP	—
Sitka		83·3	29	—	—	i 22 14	− 1	—	—	e 36·6
Shasta Dam		83·6	47	i 12 10	− 1	e 22 16	− 2	e 12 49	pP	—
Mineral	z.	84·1	48	i 12 12a	− 2	—	—	e 15 26	PP	—
Fresno		84·3	52	e 12 13a	− 2	—	—	e 12 40	pP	—
Pasadena		84·8	55	i 12 15a	− 2	e 22 28	− 2	e 12 51	pP	—
Riverside	z.	85·4	55	i 12 18a	− 2	—	—	i 12 59	pP	—
Palomar		85·6	56	i 12 20a	− 1	i 22 38	0	i 12 59	pP	—
Tinemaha		85·6	52	i 12 19a	− 2	e 22 37	− 1	i 13 0	pP	—
China Lake		85·7	53	i 12 21a	− 1	i 22 39	0	i 13 0	pP	—
Victoria		85·7	40	i 12 21a	− 1	i 22 35	− 4	—	—	—
Seattle		86·1	41	e 12 23k	− 1	e 22 42	− 1	e 13 5	pP	—
Boulder City		87·9	53	i 12 31	− 2	e 22 59	− 1	e 23 29	pS	—
Pierce Ferry		88·6	54	i 12 35	− 1	i 23 6	0	i 13 15	pP	e 38·4
Kodaikanal	E.	89·9	281	e 12 34	− 8	—	—	—	—	—
Tucson		90·3	57	i 12 43	− 1	e 23 26	+ 4	e 13 15	pP	—
Hyderabad	E.	90·4	288	—	—	i 23 2	[+ 4]	—	—	—
Salt Lake City		91·2	49	e 12 49	+ 1	e 23 31	+ 1	e 24 29	SP	e 37·5
Hungry Horse		91·6	42	i 12 48	− 2	e 23 2	[− 3]	e 13 26	pP	—
Logan		91·6	47	i 12 48	− 2	e 23 32	− 1	e 13 28	pP	—
New Delhi	N.	93·5	299	e 12 49	−10	i 23 16	[0]	e 23 36	S	—
Poona		94·9	288	13 8	+ 3	23 24	[0]	13 47	pP	—
Almata II		95·8	313	i 13 12	+ 3	—	—	—	—	—
Bombay		95·9	288	12 17	−52	i 23 34	[+ 5]	i 24 17	S	—
Almata		96·1	313	e 13 15	+ 5	i 23 35	[+ 5]	i 17 7	PP	—
Naryn		96·6	311	—	—	i 23 36	[+ 3]	—	—	—
Rybach'e		96·6	313	—	—	i 23 37	[+ 4]	—	—	—
Frunse		97·8	312	—	—	i 23 44	[+ 5]	—	—	—
Andijan		99·2	310	e 17 19	PP	i 23 50	[+ 4]	—	—	—
Fergana		99·6	310	e 13 24	− 2	i 23 52	[+ 4]	e 14 4	pP	—
Tchimkent		101·4	311	—	—	i 24 1	[+ 4]	—	—	—
Lunacharskoe		101·6	310	e 17 51	PP	24 2	[+ 4]	—	—	—
Tashkent		101·6	310	e 17 48	PP	i 24 4	[+ 6]	e 18 24	pPP	—
Stalinabad		101·8	308	i 17 48	PP	i 24 3	[+ 4]	i 18 25	pPP	—
Resolute Bay		102·7	15	i 13 38	− 2	e 25 5	+ 1	e 14 19	pP	—
Samarkand		103·2	309	—	—	e 24 9	[+ 4]	—	—	—
Sverdlovsk		106·9	327	e 17 46	PP	24 26	[+ 5]	e 26 46	PS	—
St. Louis		107·7	53	e 18 25	PP	i 25 52	S	e 26 59	sS	—
Ashkabad		110·0	307	—	—	24 43	[+ 8]	—	—	—
Huancayo		115·5	109	e 19 20	PP	e 29 17	PS	e 36 10	SS	—
Lenkoran		117·3	308	22 28	PPP	—	—	—	—	—
Ottawa	z.	117·6	44	e 18 26	[− 1]	—	—	—	—	—

Continued on next page.

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Washington	z.	117·9	51	i 19 40	PP	—	—	—	—	—
Grozny		118·8	314	e 20 0	PP	—	—	—	—	—
Palisades		119·9	49	i 18 31	[0]	—	—	—	—	e 53·6
Scoresby Sund	z.	120·0	3	e 18 32	[0]	—	—	e 19 15	pPKP	—
La Paz		120·5	117	18 35	[+ 2]	i 26 37	SKKS	i 19 57	PP	58·6
Grahamstown	z.	121·4	221	i 18 36	[+ 2]	—	—	—	—	—
Weston		121·4	46	i 18 34	[0]	e 24 38	[−39]	—	—	—
Ksara		128·5	304	i 21 4k	PP	e 30 40	PS	21 40	pPP	—
San Juan		129·6	75	i 18 49	[− 1]	i 22 9	SKP	i 19 33	pPKP	—
Skalnate Pleso		131·9	330	e 21 23	PP	e 22 29	PKS	e 23 46	PPP	—
Helwan	z.	133·3	301	i 19 1a	[+ 4]	22 8	SKP	i 19 44	pPKP	—
Collmberg	z.	133·6	336	e 18 58	[0]	e 22 15	PKS	e 19 54	pPKP	—
Prague		134·0	335	e 19 20	[+22]	e 22 14	SKP	e 22 32	PKS	—
Belgrade		134·6	325	e 19 1a	[+ 2]	e 28 17	SKKS	e 19 38	pPKP	—
Stuttgart	z.	137·0	338	e 19 4	[0]	e 22 25	SKP	—	—	—
Triest		137·5	331	e 21 56	PP	—	—	i 22 27	PPP	—
Strasbourg		137·8	338	e 19 6	[+ 1]	e 22 26	SKP	e 21 49	PP	—
Zürich		138·5	337	e 19 7	[0]	e 22 26	SKP	—	—	—
Basle		138·7	337	e 19 11	[+ 4]	e 22 39	SKP	—	—	—
Taranto		139·1	323	—	—	e 22 47	SKP	—	—	—
Prato		140·1	331	e 19 27	[+17]	22 44	SKP	—	—	—
Rome	z.	140·9	328	i 19 5	[− 6]	e 22 31	SKP	i 19 47	pPKP	—
Messina		141·5	321	e 19 4	[− 8]	e 22 35	SKP	e 32 21	PSKS	—
Tortosa		147·1	339	i 19 25	[+ 3]	—	—	—	—	—
Toledo		149·4	344	i 19 29	[+ 4]	i 23 44	pPP	i 20 15	pPKP	—
Algiers Univ.	z.	149·5	331	e 19 26	[+ 1]	—	—	e 20 16	pPKP	—
Alicante		149·6	339	19 29	[+ 3]	24 45	?	19 41	PKP_2	e 57·8
Lisbon	z.	151·6	353	19 30a	[+ 1]	—	—	i 20 28	pPKP	—
Almeria		151·7	340	i 19 28	[− 1]	42 30	SS	23 20	PP	82·3
Granada		151·8	342	19 31k	[+ 2]	26 23	[+ 5]	20 2	PKP_2	97·6
Malaga		152·4	343	i 19 44	[+14]	—	—	i 24 4	PP	e 97·3
Tamanrasset	z.	157·4	305	i 19 39k	[+ 3]	e 29 59	SKKS	i 20 13	pPKP	—

Additional readings :—
Brisbane isP =5m.19s., eSZ =8m.17s.
Apia iN =4m.54s., eEN =5m.33s., ipP =6m.10s.
Riverview iZ =5m.35s., iPPZ =6m.21s., iN =10m.10s. and 10m.42s., iE =11m.5s., iSSZ =11m.27s., iN =11m.43s., iSSSE =11m.47s., iScSN =16m.5s.
Christchurch eSS?E =13m.37s., SSZ =14m.2s., iScS?N =16m.35s.
Perth i =18m.19s. and 21m.37s.
Tokyo iPPP? =12m.0s., iPcS? =14m.42s., eSS =18m.56s.
Osaka eEN =9m.14s., e =10m.6s. and 17m.22s.
Kobe eN =17m.20s.
Zi-ka-wei PPZ =11m.59s.
Nanking ipP?Z =11m.7s., i =18m.57s., iScS =19m.25s., sS? =19m.44s.
Klyuchi isS =20m.19s.
Kabansk esS =22m.39s.
Irkutsk esS =26m.10s.
Berkeley iZ =12m.17s. and 12m.22s., eZ =15m.50s. and 16m.16s., eN =22m.14s., ePS?N =23m.18s.
College i =13m.34s., ePP =15m.23s., epPP =16m.5s., epS =22m.41s., ePS =23m.2s., eSS =27m.34s., ePKKP =30m.35s., ePKP,PKP =38m.32s., eSKP,PKP =41m.43s.
Fresno eZ =12m.48s., eE =13m.22s. and 14m.41s.
Pasadena ePPZ =15m.30s.
Riverside iZ =12m.32s., esPZ =13m.17s.
China Lake i =12m.31s., ePPEZ =15m.38s.
Seattle isP =13m.26s. and other unidentified readings.
Pierce Ferry iPP =16m.2s., eSP =24m.15s., iSS? =30m.18s.
Tucson ipP? =13m.25s., esP =13m.34s., ePP =16m.17s., ePS =24m.29s., ePKP,PKP =38m.19s.
Salt Lake City ePS =24m.44s.
Hungry Horse ePKKP =29m.57s., ePKP,PKP =39m.11s.
Logan ePP =16m.26s.
New Delhi iScSN =24m.16s.
Poona PPE =16m.55s., PPPE =18m.54s., SKKSE =23m.38s., SKKKSE =23m.42s., iSE =23m.55s., SSE =24m.55s., PSE =25m.11s., PPSE =25m.49s.
Almata iS =24m.20s., iPS =25m.52s.
Fergana ePP =17m.31s., epPP =18m.9s., PS =26m.17s.
Tashkent eSKKS =24m.38s., ePS =26m.44s.

Continued on next page.

Stalinabad iPS =26m.47s.
Resolute Bay eEN =24m.3s., eE =25m.53s. and 28m.51s.
St. Louis isS =27m.7s., i =27m.52s., eSS =33m.21s.
La Paz iPS =30m.49s., iSS =36m.25s.
San Juan ePP =20m.59s.
Skalnate Pleso e =23m.10s.
Helwan PPZ =21m.31s., eZ =23m.33s. and 24m.19s., eE =28m.11s.
Prague e =22m.27s., 22m.56s. and 23m.4s., epSKS? =23m.31s.
Belgrade ePKSZ =22m.23s., eNE =41m.17s.
Stuttgart ePKPZ =19m.8s.
Strasbourg e =23m.21s., ePS =32m.29s., eSPP =33m.59s., e =35m.11s.
Rome eZ =23m.57s., ePSKSE =32m.27s., eSSE =40m.35s.
Toledo i =19m.35s.
Algiers Univ. eZ =19m.31s.
Alicante PP =22m.21s., PPS =31m.59s., SS =37m.15s., SSS =41m.29s., Q =51m.43s.
Almeria PPP =26m.52s.
Granada sPKP =20m.23s., pPKP$_2$ =20m.59s., iPP =23m.26s., sSKKS =31m.11s., SS =42m.38s.
Tamanrasset iZ =19m.51s., ePKP$_2$Z =20m.21s., epPKP$_2$Z =20m.55s., eZ =22m.41s., ePPZ =23m.48s., epPPZ =24m.32s., iPPPZ =27m.32s., epPPPZ =28m.7s., eZ =32m.16m., ePSKSZ =33m.54s.
Long waves were also recorded at Paris.

March 24d. 20h. 52m. 30s. Epicentre 13°·1N. 88°·4W.

Pasadena suggests depth 100km.

A = +·0272, B = −·9740, C = +·2252 ; δ = +13 ; h = +6 ;
D = −1·000, E = −·028 ; G = +·006, H = −·225, K = −·974.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida		7·9	352	i 1 55a	− 4	i 3 28	− 2	—	—	—
Oaxaca		9·0	297	i 2 15	+ 2	i 4 2	+ 4	—	—	—
Balboa Heights		9·6	114	i 2 27	+ 6	—	—	—	—	—
Vera Cruz		9·6	310	e 2 21	0	i 4 15	+ 3	—	—	—
Puebla		11·1	303	e 2 40	− 3	i 4 49	0	—	—	—
Tacubaya		12·1	303	e 3 1	+ 4	e 5 23	+ 9	i 5 44	sS	—
Chinchina		15·0	121	i 3 36	+ 1	i 7 45	?	i 15 51	ScS	e 9·0
Guadalajara		16·1	300	e 3 49	0	i 7 46	?	—	—	—
Port au Prince		16·4	67	e 4 4	+11	i 7 19	+23	7 39	SS	—
Bogota		16·5	119	i 3 55	+ 1	i 7 10	+12	i 15 54	ScS	8·4
Columbia		21·9	16	i 4 58	+ 1	i 8 50	− 4	i 5 15	pP	e 9·8
San Juan		22·1	73	e 4 56	− 3	e 9 10	+12	e 5 15	pP	e 11·8
St. Louis		25·5	356	e 5 29	− 3	i 9 55	− 2	i 5 47	pP	—
Florissant		25·7	356	e 5 33	0	e 9 57	− 4	i 5 49	pP	e 13·0
Fort de France		26·5	83	e 5 55	+14	e 10 59	+45	—	—	—
Washington	Z.	27·6	19	i 5 52	+ 1	i 10 28	− 4	e 12 36	ScP	—
Tucson		28·0	318	e 5 55	0	e 11 13	sS	i 6 11	pP	—
Huancayo		28·1	152	e 5 55	0	e 10 39	− 1	e 6 45	PP	—
Chicago		28·6	0	e 6 11	+11	e 11 18	sS	e 6 50	PP	e 11·9
Lincoln	E.	28·6	347	e 6 8	+ 8	e 11 0	+12	—	—	e 13·3
Cleveland		28·9	11	i 6 3k	0	e 10 55	+ 2	i 6 19	pP	—
Pennsylvania		29·1	16	i 6 4	0	i 11 1	+ 5	i 6 20	pP	—
Fordham		30·4	23	i 6 21	+ 5	e 11 14	− 2	—	—	—
Palisades		30·6	23	i 6 17	− 1	i 11 19	− 1	i 6 31	pP	e 14·4
Pierce Ferry		32·5	320	i 6 33	− 1	e 16 54	ScS	i 12 58	PcS	—
Weston		32·7	24	i 6 36	0	e 11 48	− 4	—	—	e 16·0
Palomar		32·8	314	i 6 37a	0	i 13 0	ScP	i 6 51	pP	—
Boulder City		32·9	319	i 6 38	0	i 17 2	ScS	i 7 7	pP	—
Rapid City	E.	33·4	341	e 6 43	+ 1	e 12 16	+13	e 6 58	pP	e 15·2
Riverside	Z.	33·5	314	i 6 43	0	i 13 2	ScP	i 7 1	pP	—
Ottawa		33·9	16	6 47	0	e 12 13	+ 2	—	—	17·5
Pasadena		34·2	314	e 6 49	0	i 13 5	ScP	i 7 3	pP	e 15·5
Salt Lake City		34·4	328	—	—	e 12 44	PcS	—	—	—
China Lake		34·7	317	i 6 52a	− 2	e 12 49	+25	i 7 8	pP	e 17·7
Logan		35·1	330	e 6 57	0	e 12 52	PcS	e 7 11	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		35·6	144	i 7 2	+ 1	i 12 33	− 5	8 30	PP	17·7
Tinemaha	z.	35·8	318	e 7 5	+ 2	i 13 10	ScP	e 7 20	pP	—
Shawinigan Falls	N.	35·9	19	e 7 2	− 2	—	—	—	—	—
Fresno		36·6	317	e 7 19	+ 9	e 13 11	ScP	e 8 56	PP	e 17·3
Seven Falls	E.	37·0	20	e 7 12	− 1	—	—	—	—	17·6
Bozeman		37·7	335	e 7 33	+14	e 13 5	− 5	—	—	e 16·0
Lick	z.	38·2	316	i 7 23k	0	i 13 19	+ 2	—	—	—
Reno		38·2	320	e 7 24k	+ 1	e 13 16	− 1	e 13 39	ScP	—
Berkeley		38·9	316	e 7 26	− 3	e 13 21	− 7	e 9 37	PcP	e 19·1
Mineral	z.	39·8	320	e 7 36k	0	e 13 24	ScP	i 7 55	pP	—
Shasta Dam		40·5	320	e 7 34	− 8	i 13 25	ScP	i 8 42	PP	—
Hungry Horse		41·1	335	e 7 46	− 1	e 13 29	ScP	i 9 44	PP	—
Seattle		44·6	329	e 8 43	+27	—	—	—	—	—
Victoria		45·7	329	8 23	− 1	—	—	—	—	26·5
La Plata		55·8	149	9 48	+ 7	17 18	−10	—	—	30·7
Resolute Bay		61·7	358	i 10 16	− 6	e 18 35	− 9	10 46	PcP	e 30·2
College		65·5	337	e 10 42	− 5	e 15 15	ScP	i 11 1	pP	e 28·6
Granada		78·1	54	12 18	+16	21 54	− 2	—	—	37·0
Besançon		83·5	43	e 13 2?	pP	—	—	—	—	—
Strasbourg		84·3	41	e 12 54	pP	—	—	—	—	e 39·5
Stuttgart		85·2	41	e 12 34	− 5	—	—	e 16 17	PP	e 42·5
Collmberg	z.	86·9	38	e 12 43	− 5	—	—	—	—	—
Tamanrasset	z.	88·5	67	e 12 51	− 5	e 23 29	[+ 5]	e 38 55	P′P′	40·5

Additional readings :—
Vera Cruz i = 3m.24s., 3m.28s., and 3m.56s.
Tacubaya i = 5m.35s.
Port au Prince i = 4m.24s.
Bogota iPPN = 4m.8s., iPPPEN = 4m.23s., i = 5m.10s.
San Juan iPP = 5m.48s., i = 6m.7s.
Florissant esS = 10m.34s., i = 10m.43s.
Washington iZ = 6m.8s.
Tucson ePP = 6m.59s., eScS = 12m.45s.
Chicago eScP = 12m.32s.
Cleveland eSSE = 11m.57s.
Pennsylvania iPPN = 6m.53s., iPcP?E = 9m.18s., isSEN = 11m.23s., eN = 11m.59s., iE = 12m.9s.
Palomar iZ = 7m.30s., iNZ = 7m.50s., iPcPZ = 9m.10s., iZ = 9m.21s., eZ = 13m.34s., iScSN = 16m.59s., iN = 17m.29s.
Boulder City iScP = 13m.0s.
Rapid City esPE = 7m.14s., esPPE = 8m.38s.
Riverside iPPZ = 7m.39s., ePcPZ = 9m.15s., iZ = 9m.38s., eZ = 9m.49s., iScSE = 17m.4s.
Pasadena iPPZ = 7m.57s., iZ = 9m.40s., eZ = 9m.52s., iScSEN = 17m.8s.
China Lake isP?NZ = 7m.19s., iPcPZ = 9m.25s., iScPEZ = 13m.4s., eE = 13m.42s., iScSEN = 17m.10s.
Logan ePcP = 9m.36s., eS = 15m.40s., eScS = 16m.46s.
La Paz iScS? = 17m.18s.
Tinemaha iZ = 7m.37s., iPcPZ = 9m.29s., eZ = 9m.46s., eScSZ = 17m.18s.
Fresno eN = 7m.39s., eZ = 9m.57s.
Lick iZ = 7m.28s., 7m.40s., and 8m.33s.
Reno eZ = 7m.40s., eE = 8m.1s.
Berkeley eZ = 8m.36s., eSEN = 13m.55s., eN = 16m.54s.
Mineral iZ = 8m.51s.
Hungry Horse eScS = 17m.42s.
Seattle e = 9m.0s., 9m.33s., and 10m.32s.
Resolute Bay eZ = 10m.34s. and 11m.23s., eEN = 19m.0s.
College isP = 11m.15s.
Tamanrasset eZ = 15m.50s.
Long waves were also recorded at Halifax, Scoresby Sund, and other European stations.

March 24d. Readings also at 0h. (Puebla and near Tacubaya), 1h. (Toledo and near Malaga), 2h. (Tacubaya and near Khorog), 3h. (Auckland), 5h. (Pretoria), 6h. (College, Apia, near Klyuchi, and near Istanbul), 7h. (College and Ashkabad), 9h. (Chatra), 10h. (Ksara, near Almata II, Frunse, Krasnogorka, and Naryn), 11h. (Apia), 13h. (Tacubaya and near Klyuchi), 14h. (College (2)), 15h. (near Ottawa), 18h. (Chatra and near Khorog), 19h. (Fergana, Samarkand, near Andijan, and Khorog), 21h. (College, Palisades, and near Athens), 22h. (Hungry Horse, College, and near Klyuchi), 23h. (near Hungry Horse).

March 25d. 15h. 33m. 15s. Epicentre 13°·1N. 88°·4W. (as on 24d.).

Pasadena suggests depth 100km. as for 24d. earthquake.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida		7·9	352	e 1 24	?	—	—	—	—	—
Oaxaca		9·0	297	—	—	e 3 58	0	—	—	—
Vera Cruz		9·6	310	—	—	e 4 6	− 6	—	—	—
Puebla		11·1	303	e 4 13	?	e 4 46	− 3	—	—	i 5·4
Tacubaya		12·1	303	e 3 27	PP	e 5 40	+26	—	—	—
San Juan		22·1	73	i 5 19	pP	—	—	—	—	—
Tucson		28·0	318	e 5 56	+ 1	—	—	e 6 13	pP	—
Pierce Ferry		32·5	320	i 6 33	− 1	—	—	—	—	—
Palomar	z.	32·8	314	i 6 37	0	—	—	i 6 52	pP	—
Boulder City		32·9	319	e 6 38	0	—	—	—	—	—
Riverside	z.	33·5	314	e 6 41	− 2	e 9 21	PcP	e 6 58	pP	—
Pasadena	z.	34·2	314	e 7 3	pP	—	—	—	—	—
China Lake	z.	34·7	317	i 6 52	− 2	e 13 7	ScP	i 7 8	pP	—
Logan		35·1	330	e 7 4	+ 7	—	—	e 7 15	pP	—
Tinemaha	z.	35·8	318	e 7 3	0	—	—	e 9 28	PcP	—
Mineral	z.	39·8	320	e 7 38s	+ 2	—	—	e 9 40	PcP	—
Hungry Horse		41·1	335	i 7 46	− 1	—	—	—	—	—
Victoria	z.	45·7	329	8 22	− 2	—	—	—	—	—
College		65·5	337	e 10 43	− 4	—	—	—	—	—

China Lake gives also iZ = 7m.18s., iPcPZ = 9m.24s., iZ = 9m.41s.

March 25d. 16h. 51m. 32s. Epicentre 39°·3N. 73°·3E. (as on 1950, July 6d.).

A = +·2230, B = +·7432, C = +·6308; δ = −2; h = −1;
D = +·958, E = −·287; G = +·181, H = +·604, K = −·776.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		
	°	°	m. s.	s.	m. s.	s.	m. s.		
Andijan	1·6	334	i 0 29	− 1	i 0 55	S*	1 0	S_g	
Fergana	1·6	313	e 0 29	− 1	e 0 53	+ 2	e 0 32	P_g	
Khorog	2·3	216	0 35	− 5	1 6	− 3	—	—	
Naryn	3·0	44	i 0 53	+ 3	i 1 24	− 3	—	—	
Frunse	3·7	14	e 1 9	P*	e 1 42	− 3	i 2 4	S_g	
Lunacharskoe	3·7	305	e 1 1	+ 1	e 1 51	S*	e 1 59	S_g	
Tashkent	3·7	305	e 0 58	− 2	—	—	e 1 7	P*	
Rybach'e	3·8	33	e 1 1	0	e 2 15	S_g	e 1 22	P_g	
Tchimkent	4·1	318	e 1 5	0	e 2 17	S_g	—	—	
Krasnogorka	4·2	19	i 1 9	+ 2	—	—	—	—	
Almata	4·8	33	e 1 13	− 2	—	—	—	—	
Samarkand	4·9	276	e 1 18	+ 1	e 2 36	S_g	—	—	
Almata II	5·0	36	e 1 16	− 2	—	—	e 1 29	P*	
Przhevalsk	5·0	49	i 1 15	− 3	2 42?	S_g	i 1 29	P*	
Ili	5·4	30	e 1 21	− 3	i 2 34	+ 6	i 1 36	P*	

Additional readings :—
Fergana eS_g = 59s.
Frunse iS* = 1m.52s.
Ili i = 2m.54s.

March 25d. 18h. 25m. 27s. Epicentre 2°·2N. 126°·9E. (as on 1950, July 29d.).

A = −·6000, B = +·7991, C = +·0382; δ = +2; h = +7;
D = +·800, E = +·600; G = −·023, H = +·031, K = −·999.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Manila		13·6	335	e 3 7	−10	—	—	e 3 57	PPP
Djakarta		21·7	248	—	—	e 8 25	−26	—	—
Brisbane	z.	38·8	141	i 7 33k	+ 5	—	—	—	—
Vladivostok		41·0	6	i 7 45	− 1	e 13 54?	− 5	—	—
Kabansk		52·5	345	9 16	− 1	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Irkutsk		53·3	343	e 9 21	− 2	e 16 52?	− 2	—	—
Poona		54·4	291	i 9 30	− 1	i 17 2	− 7	12 46	PPP
Przhevalsk		59·0	321	i 10 3	− 1	—	—	—	—
Almata II		60·0	321	e 10 9	− 2	—	—	—	—
Ili		60·5	322	e 10 12	− 2	—	—	—	—
Frunse		61·6	318	i 10 21	− 1	—	—	—	—
Khorog		61·6	320	e 10 23	+ 1	—	—	—	—
Andijan		62·3	316	10 24	− 2	e 18 48	− 4	—	—
Fergana		62·5	316	e 10 25	− 3	—	—	—	—
Stalinabad		64·1	313	i 10 36	− 2	e 19 9	− 5	—	—
Tashkent		64·4	315	e 10 38	− 2	e 19 12?	− 6	—	—
Samarkand		65·7	313	e 10 48	0	—	—	—	—
Sverdlovsk		75·3	329	—	—	e 21 18	− 8	—	—
Baku		78·7	311	e 12 7	+ 1	—	—	—	—
Grozny		82·0	313	e 12 13	−10	—	—	—	—
Tiflis		82·6	311	e 12 28	+ 2	—	—	—	—
Borzhomi		83·7	312	e 12 37	+ 5	—	—	—	—
Abastumanj		84·1	312	e 12 38	+ 4	—	—	—	—
College		86·0	25	i 12 43	0	—	—	—	—
Ksara		89·6	304	e 18 14	PPP	e 25 13	PS	—	—
Istanbul	z.	94·5	313	e 13 25	+ 2	—	—	—	—
Resolute Bay	z.	99·3	11	e 13 45	0	—	—	e 17 42	PP
Shasta Dam		104·1	46	e 15 29	?	—	—	e 18 23	PP
Hungry Horse		107·2	37	e 18 32	PP	—	—	—	—
Boulder City		111·2	49	e 18 42	[+ 6]	—	—	—	—
Pierce Ferry		111·8	49	e 18 42	[+ 5]	—	—	—	—
Tucson		115·6	52	e 19 37	PP	—	—	—	—
Tamanrasset	z.	117·7	297	e 18 54	[+ 6]	—	—	e 20 3	PP
San Juan		155·9	30	i 20 27	PKP_2	—	—	—	—

Additional readings :—
Poona iEZ =14m.51s., PSEZ =17m.14s., PPSEZ =17m.21s.
College e =13m.22s.
Resolute Bay eZ =18m.21s.
Long waves were recorded at Christchurch and Paris.

March 25d. 20h. Fiji region. Depth 600km. (Pasadena).

Apia eP =11m.49s., S =13m.56s.
Mount Wilson iPZ =21m.1s.
Riverside ePZ =21m.2s.
Palomar iPZ =21m.3s.
China Lake iPZ =21m.5s.k.
Shasta Dam iP =21m.7s.
Tinemaha iPZ =21m.9s.
Reno ePZ =21m.11s.k.
Boulder City iP =21m.18s.
Pierce Ferry iP =21m.21s.
Tucson iP =21m.24s.
College eP =21m.42s.
Hungry Horse iP =21m.50s.
Copenhagen iPKP =28m.23s.k.
Collmberg eZ =28m.34s. and 28m.38s.
Stuttgart ePKPZ =28m.34s., eZ =28m.42s. and 28m.52s.
Jena eE =28m.37s.
Strasbourg ePKP =28m.43s.

March 25d. Readings also at 0h. (Apia, Manila, and Tucson), 1h. (Toledo and near Granada), 2h. (Bogota, Chinchina, College (2), near Chatra, and near Andijan), 3h. (Port au Prince), 4h. (near Messina and near Mizusawa), 5h. (College and near Klyuchi), 6h. (Apia and Brisbane), 7h. (China Lake, Boulder City, near Bogota, and Chinchina), 13h. (Apia, Brisbane, and College), 14h. (Hungry Horse and La Paz), 16h. (Granada), 17h. (near Krasnogorka), 18h. (Hungry Horse (2) and College), 20h. (Apia), 22h. (College).

March 26d. Readings at 0h. (Ashkabad, Mount Wilson, Palomar, China Lake (2), Boulder City, Pierce Ferry, Hungry Horse, Brisbane, Riverview, near Kirovobad, and near Klyuchi), 1h. (near College, near Apia, and near Klyuchi), 3h. (Copiapo), 4h. (College, near Klyuchi (2), and near Algiers Univ.), 5h. (Tucson and College), 6h. (Apia and Pierce Ferry), 7h. (Collmberg and near Klyuchi), 8h. (Collmberg, Stuttgart, Abastumanj, Lenkoran, near Akhalkalaki, Borzhomi, Erevan, Grozny, Kirovobad, Leninakan, Tiflis, Tsikhlis-Dzhvari, near Hungry Horse (2), near Klyuchi, and near Petropavlovsk), 9h. (College, near Copiapo, and near Klyuchi), 10h. (near Yalta), 11h. (Tucson, Hungry Horse, College, Washington, Weston, Oaxaca, Puebla, Tacubaya, Port au Prince, and near San Juan), 12h. (Palisades), 16h. (New Delhi, Seattle, Victoria, and Hungry Horse), 18h. (Ashkabad), 19h. (Auckland, Kaimata, Tuai, Wellington, Pasadena, Riverside, China Lake, Tinemaha, Tucson, and Pierce Ferry), 20h. (Ksara, near Manila, near Khorog, and near Ashkabad), 21h. and 22h. (2) (near Ashkabad), 23h. (College).

March 27d. 12h. 1m. 38s. Epicentre 28°·1N. 112°·6W. (as on 1949, Nov. 20d.).

$A = -\cdot3397$, $B = -\cdot8161$, $C = +\cdot4675$; $\delta = -3$; $h = +2$;
$D = -\cdot923$, $E = +\cdot384$: $G = -\cdot180$, $H = -\cdot432$, $K = -\cdot884$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tucson		4·5	20	i 1 4	− 7	i 1 37	P_g	i 1 10	P	e 1·9
La Jolla	Z.	6·3	321	e 1 52	P*	i 3 19	S*	—	—	—
Palomar		6·4	326	e 1 44	+ 6	i 3 29	S_g	—	—	—
Riverside		7·2	326	e 1 57	+ 8	i 3 50	S_g	—	—	—
Pasadena		7·7	323	e 1 58	+ 2	e 4 3	S*	—	—	e 3·6
Boulder City		8·1	347	e 1 59	− 3	—	—	—	—	i 4·4
Pierce Ferry		8·1	352	i 1 58	− 4	(e 3 49)	+14	—	—	e 3·8
China Lake		8·8	333	e 2 13	+ 2	i 4 44	S_g	e 2 27	P*	—
Fresno		10·6	327	e 2 47a	+11	—	—	—	—	e 5·5
Logan		13·7	3	e 3 15	− 3	—	—	—	—	e 7·2
Mineral	Z.	14·4	331	e 3 35a	+ 8	—	—	—	—	e 7·6
Shasta Dam		15·0	330	e 3 31	− 4	—	—	—	—	—
Tacubaya		15·0	122	—	—	e 6 16	− 7	—	—	—
Rapid City	E.	17·7	24	e 4 10	0	(e 7 47)	+21	—	—	e 7·8
Hungry Horse		20·3	359	e 4 37	− 3	—	—	—	—	—
College		43·0	339	e 8 2	− 1	—	—	—	—	—

Additional readings :—
Tucson i = 1m.17s.
Palomar iZ = 1m.52s., iN = 3m.25s.
Pierce Ferry i = 2m.6s.
Fresno eN = 2m.58s., eE = 3m.47s., eZ = 4m.0s.
Shasta Dam i = 3m.41s.
Long waves were also recorded at Berkeley, Seven Falls, Shawinigan Falls, Ottawa, Halifax, Washington, and Weston.

March 27d. 13h. South Pacific.

Brisbane iPZ = 49m.14s.
Riverview iS?E = 54m.23s., iE = 54m.32s., eLZ = 56m.30s.
Shasta Dam iP = 58m.12s.
Mineral ePZ = 58m.16s.k.
Riverside ePZ = 58m.16s.
Palomar iPZ = 58m.17s.
China Lake iPZ = 58m.17s., ipP?Z = 58m.33s., isP?Z = 58m.41s.
College iP = 58m.20s., ipP = 58m.32s.
Boulder City iP = 58m.30s.
Pierce Ferry iP = 58m.33s., ipP = 58m.46s.
Tucson eP = 58m.39s., epP = 58m.52s.
Hungry Horse eP = 58m.54s.
Stuttgart ePKPZ = 65m.0s.
Strasbourg iPKP = 65m.3s.k.
Besançon iPKP = 65m.8s., e = 65m.48s.
Paris iPKP = 65m.10s., i = 66m.18s.
Tamanrasset ePKPZ = 65m.28s., $ePKP_2Z$ = 66m.15s.
Long waves were also recorded at Christchurch and Wellington.

March 27d. Readings also at 2h. (Apia), 3h. (near Manila), 4h. (Pretoria and near Khorog), 5h. (near Klyuchi (2)), 6h. (Apia, College, and Pierce Ferry), 7h. (near Ashkabad (2), and near Klyuchi (2)), 9h. (near Ashkabad and Klyuchi), 9h. (Hungry Horse, near College (2), near Klyuchi, and near Apia), 10h. (Pierce Ferry, Almata, Almata II, Frunse, Ili, Mary, Naryn, Rybach'e, Tchimkent, near Andijan, Fergana, Samarkand, Stalinabad, Tashkent, and near La Paz), 11h. (College and Tacubaya), 12h. (Tacubaya, near Santa Clara, and near Tucson), 13h. (near Klyuchi), 14h. (near Istanbul), 15h. (Tucson (2), Boulder City, Pierce Ferry (2), Shasta Dam, and Hungry Horse), 17h. (Grozny), 18h. (Ksara, near Istanbul, and near Klyuchi (2)), 19h. (Pasadena, Riverside, China Lake, Tucson, Boulder City, Pierce Ferry, Hungry Horse, Shasta Dam, and College), 21h. (near Ashkabad and near Istanbul (2)), 22h. (Apia and College), 23h. (Tamanrasset, College, Stuttgart, Bombay, Poona, Calcutta, Chatra, and New Delhi).

March 28d. 1h. 55m. 14s. Epicentre 36°·9S. 177°·1E. Depth of focus 0·050.

Felt with maximum intensity IV-V from East Cape and Whakatane as far as Cook's Strait. Epicentre as adopted. Depth 370km.

R. C. Hayes.
Earthquake origins in New Zealand during the year 1951, New Zealand Journal of Science and Technology, Sect. B, Vol. 34, No. 4, Jan., 1953, p.253.

$A = -\cdot 8006$, $B = +\cdot 0406$, $C = -\cdot 5978$; $\delta = -3$; $h = -1$;
$D = +\cdot 051$, $E = +\cdot 999$; $G = +\cdot 597$, $H = -\cdot 030$, $K = -\cdot 802$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	1·8	271	i 0 53	+ 3	i 1 34	+ 4	i 14 18	ScS	—
Tuai	N.	1·9	179	i 0 53	+ 2	—	—	—	—	—
New Plymouth	E.	3·2	228	i 1 3	+ 1	i 1 53	+ 3	—	—	—
Bunnythorpe		3·6	198	e 1 4	− 1	—	—	—	—	—
Wellington		4·7	201	i 1 16	− 1	—	—	14 16	ScS	—
Kaimata	N.E.	7·1	216	1 43	− 1	i 3 1	− 5	—	—	—
Christchurch		7·5	206	1 47	− 2	i 3 11	− 4	—	—	—
Riverview		21·4	269	i 6 2	?	i 7 56	+ 4	i 8 3	PcP	—
Brisbane		22·4	287	i 4 30k	− 1	e 8 13	+ 4	—	—	—
Apia		25·1	27	e 4 51	− 5	e 11 59	PcS	—	—	—
Djakarta		70·6	277	—	—	i 20 22	SP	—	—	—
Manila		73·5	303	—	—	e 19 46?	−10	—	—	—
Pasadena		92·9	49	i 12 36	+ 1	i 23 18	+11	i 16 24	PP	—
Berkeley	Z.	93·1	44	e 12 32a	− 4	—	—	—	—	—
Lick		93·1	44	e 12 38	+ 2	—	—	—	—	—
Palomar		93·1	50	i 12 38a	+ 2	i 22 40	[+ 6]	e 13 58	pP	—
Riverside	Z.	93·3	49	i 12 37a	0	—	—	e 14 0	pP	—
Fresno	Z.	93·7	46	e 12 39	+ 1	—	—	—	—	—
China Lake		94·4	48	i 12 43a	+ 1	e 22 43	[+ 2]	i 14 6	pP	—
Tinemaha	Z.	94·8	47	e 12 45	+ 1	—	—	—	—	—
Shasta Dam		95·1	41	e 12 44	− 1	—	—	e 16 39	PP	—
Mineral	Z.	95·2	42	e 12 46a	+ 1	—	—	—	—	—
Boulder City		96·1	49	e 12 51	+ 1	e 23 50	+16	e 16 47	PP	—
Tucson		96·2	54	i 12 52	+ 2	e 24 1	+26	e 16 50	PP	—
Pierce Ferry		96·7	50	e 12 53	+ 1	—	—	i 16 54	PP	—
La Paz		99·2	118	e 13 0	− 4	—	—	—	—	—
Logan		101·7	46	e 17 17	PP	—	—	—	—	—
Hungry Horse		104·6	40	e 13 28	+ 1	—	—	—	—	—
College		105·1	14	e 13 30	+ 1	—	—	e 17 40	PKP	—
San Juan		122·0	89	i 18 14	[+ 1]	—	—	i 18 34	?	—
Resolute Bay		124·7	18	e 18 16	[− 2]	—	—	e 19 48	PP	—
Palisades		126·0	62	i 18 21	[0]	e 37 4	SS	—	—	—
Ottawa	Z.	126·2	56	e 18 22	[+ 1]	—	—	e 19 51	PP	—
Weston		128·3	61	e 17 26	[−59]	—	—	e 20 14	PP	—
Seven Falls	E.	130·0	55	e 21 19	pPP	(38 16)	SS	e 21 54	PKS	38·3
Scoresby Sund	Z.	144·9	11	i 18 55a	[− 1]	—	—	—	—	—
Ksara		148·4	276	e 19 5	[+ 3]	22 40	PKS	20 34	pPKP	—
Reykjavik	Z.	150·4	17	i 19 13	[+ 9]	—	—	i 19 22	PKP$_2$	—
Helwan	Z.	150·7	267	e 19 7	[+ 2]	e 22 48	PKS	e 20 31	pPKP	—
Istanbul	Z.	154·9	291	e 19 12	[+ 1]	—	—	e 23 14	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Collmberg	z.	161·7	327	i 19 6	[−13]	—	—	e 19 51	PKP$_2$	—
Prague		161·9	324	e 20 10	PKP$_2$	—	—	—	—	—
Jena	n.	162·6	328	e 20 7?	[+47]	—	—	—	—	—
Rathfarnham C.	z.	163·4	7	i 20 11	[+51]	e 34 10	?	i 20 34	?	—
De Bilt		163·8	342	—	—	e 44 46	SS	—	—	—
Tamanrasset	z.	164·2	209	e 19 23	[+ 2]	—	—	e 20 59	pPKP	—
Triest		164·7	313	i 20 22	PKP$_2$	—	—	e 24 11	PP	—
Stuttgart		165·2	328	e 19 23	[+ 1]	e 45 46	PSS	i 20 22	PKP$_2$	—
Kew		165·3	354	e 24 46?	pPP	—	—	—	—	—
Strasbourg		166·0	331	e 19 26	[+ 3]	e 25 39	[−12]	e 20 47	pPKP	—
Rome	z.	167·0	300	e 20 30	PKP$_2$	—	—	e 24 15	PP	—
Paris		167·4	346	i 20 34	PKP$_2$	—	—	i 24 28	PP	—
Besançon		167·8	331	e 19 26	[+ 2]	—	—	e 20 32	PKP$_2$	—
Tortosa	n.	175·7	—	21 2	pPKP	—	—	26 5	pPP	—
Toledo		176·9	—	e 19 32	[+ 4]	—	—	e 21 47	PKP$_2$	—
Alicante		177·6	—	e 19 49	[+21]	25 25	[+30]	21 25	PKP$_2$	e 69·0
Malaga		178·8	—	21 26	PKP$_2$	23 38	PKS	25 16	PP	—
Granada		179·4	—	21 29k	PKP$_2$	22 53	SKP	25 29	PP	90·0
Almeria		179·6	—	e 19 26	[− 2]	46 52	SS	25 16	PP	89·7

Additional readings :—
Brisbane eEN =6m.13s., iSE =8m.21s.
Apia eE =10m.5s.?, and 14m.56s.
Palomar iPPNZ =16m.27s., iE =23m.1s., iSEN =23m.22s.
Riverside iPPZ =16m.28s.
China Lake ePPN =16m.27s., e =16m.36s., eSN =23m.31s.
Mineral iZ =13m.2s., eZ =16m.52s.
Tucson ePKKP =29m.35s.
Pierce Ferry i =13m.12s.
Helwan iZ =19m.14s., eZ =21m.14s. and 24m.10s.
Istanbul ePKPZ =19m.38s.
Jena eN =20m.11s., eE =20m.15s.
Tamanrasset ePKP$_2$Z =20m.21s., ePPZ =24m.2s.
Stuttgart eZ =21m.47s., ePP =24m.10s., e =25m.34s., ePSKS =34m.34s., eSSS = 51m.46s.?.
Strasbourg ePKP$_2$ =20m.25s., ePP =24m.14s., e =27m.51s.
Paris i =20m.44s. and 24m.18s., eL? =38m.46s.?.
Alicante PP =24m.29s., PPS =36m.1s., Q =62m.23s.
Malaga PPP =29m.42s.
Granada iSKKS =31m.32s., SKSP =35m.41s., SS =45m.47s., SSP =48m.1s., SSS = 54m.53s.
Almeria SKS =26m.38s., PPP =29m.38s.

March 28d. 10h. 3m. 11s. Epicentre 18°·0S. 167°·7E. (as on 1950, December 8d.).

A = −·9299, B = +·2027, C = −·3071 ; δ = +11 ; h = +5 ;
D = +·213, E = +·977 ; G = +·300, H = −·065, K = −·952.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		16·5	232	i 3 47	− 7	e 7 5	+ 7	—	—	e 8·6
Riverview		21·6	219	i 4 57a	+ 3	e 8 49	0	e 5 29	PPP	e 10·4
Wellington		24·0	167	—	—	e 9 59	+27	11 56	Q	15·3
Christchurch		25·8	171	—	—	e 11 49?	SSS	—	—	—
Berkeley	z.	86·0	48	e 12 44k	+ 1	—	—	—	—	e 44·3
Lick		86·2	48	e 12 45	+ 1	—	—	—	—	—
Shasta Dam		87·2	45	i 12 50	+ 1	—	—	e 17 42	?	—
Fresno		87·3	50	e 12 51a	+ 1	—	—	e 17 21	?	—
Pasadena		87·5	53	i 12 51k	0	—	—	i 17 5	PP	e 37·6
Riverside	z.	88·0	53	i 12 54k	+ 1	—	—	—	—	—
Palomar		88·1	54	i 12 55k	+ 1	—	—	i 13 12	?	—
China Lake		88·6	52	i 12 57k	+ 1	—	—	e 13 11	?	—
Tinemaha		88·6	50	i 12 57k	+ 1	—	—	—	—	—
College		89·3	17	i 12 57	− 2	—	—	—	—	—
Victoria	z.	90·1	38	i 13 3k	0	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Seattle		90·3	40	i 13 6k	+ 2	—	—	i 13 19	?	—
Boulder City		90·7	52	i 13 7	+ 1	—	—	—	—	—
Pierce Ferry		91·4	52	i 13 10	+ 1	—	—	e 17 0	PP	—
Tucson		92·5	56	i 13 15	+ 1	e 23 17	[−30]	e 16 40	PP	e 40·1
Logan		94·9	47	e 17 32	PP	—	—	—	—	—
Hungry Horse		95·7	41	e 13 28	− 1	—	—	—	—	—
Tacubaya		98·6	73	—	—	e 33 45	?	—	—	—
Ottawa		121·2	46	e 28 15	PKKP	—	—	—	—	51·8
Palisades		122·9	52	—	—	e 27 38	{+ 5}	—	—	—
Seven Falls	E.	124·3	45	e 30 45	PS	(42 49?)	SSS	—	—	42·8
Weston		124·7	50	e 16 46	?	—	—	—	—	e 50·2
San Juan		126·0	80	e 18 57	[− 7]	e 30 52	SKSP	e 23 53	PPP	—
Fort de France		133·1	87	e 23 31	?	e 27 15	?	—	—	—
Ksara		134·3	299	e 25 19	PPP	42 21	?	—	—	—
Helwan	Z.	138·6	295	e 28 0	?	e 30 44	?	—	—	—
Stuttgart		144·7	335	e 19 37	[− 2]	—	—	e 19 54	PKP_2	e 70·8
Strasbourg		145·4	335	e 19 40	[0]	—	—	e 19 53	PKP_2	e 61·8
Paris		147·0	342	i 19 44	[+ 1]	—	—	i 20 1	PKP_2	e 63·8
Besançon		147·2	337	e 19 44	[+ 1]	—	—	e 19 57	PKP_2	—
Rome	Z.	148·2	323	—	—	e 30 58	?	—	—	—
Tamanrasset	Z.	162·7	290	e 20 3	[0]	—	—	e 20 57	PKP_2	—

Additional readings :—
Berkeley eZ =13m.5s. and 17m.28s., eN =27m.43s. and 43m.43s.
Pierce Ferry iZ =13m.42s.
Tucson ePPP =18m.27s., e =22m.31s., eSS? =28m.37s.
San Juan ePP? =22m.25s., eSS =37m.57s.
Tamanrasset eZ =20m.35s., ePPZ =24m.33s.
Long waves were also recorded at Nanking, Zi-ka-wei, Scoresby Sund, Collmberg, Clermont-Ferrand, Almeria, and Granada.

March 28d. Readings also at 0h. (Collmberg), 1h. (Ksara, La Plata, and San Juan), 3h. (near Athens), 6h. (Tacubaya and near Ashkabad), 7h. (Fergana, Andijan, Samarkand, Tchimkent, near Khorog, and near Ashkabad), 9h. (Riverside, Palomar, China Lake, Tinemaha, and Tucson), 10h. (La Plata, La Paz, Huancayo, Chinchina, Concepción, Copiapo, Santa Lucia, Brisbane, Christchurch, Wellington, College, Apia, Ottawa, and near Makhach-kala ; several shocks), 12h. (Bombay, New Delhi, and near Huancayo), 13h. (Scoresby Sund, Shasta Dam, Hungry Horse, near College, near Tchimkent, Khorog, Fergana, Samarkand, and Andijan), 14h. (College, Hungry Horse, Pretoria, Tamanrasset, and near Athens), 16h. (Mineral), 18h. (Stuttgart, Collmberg, College, Hungry Horse, Shasta Dam, and near Mizusawa), 19h. (College, Nanking, Zi-ka-wei, and Vladivostok), 20h. (Djakarta, Brisbane (2), Hungry Horse, Pierce Ferry, Shasta Dam, and near Klyuchi), 22h. (College, Tamanrasset, Naryn, Almata II, Frunse, Rybach'e, near Khorog, Stalinabad, Fergana, Samarkand, Andijan, and Tchimkent), 23h. (Ashkabad, near Akhalkalaki, and Gandzha).

March 29d. 5h.-6h. South America.

Concepción 55m.36s., 56m.45s., and 57m.34s.
Santa Lucia eN =57m.50s. and 59m.27s.
La Plata PE =58m.16s., SE =60m.54s., L?E =63·7m.
La Paz P =60m.44s., iS? =64m.50s., L =66·0m.
San Juan iP =65m.6s., ipP =65m.29s.
Tacubaya eP =65m.53s.
Pretoria iPZ =67m.9s.
Tucson iP =67m.17s., ipP =67m.41s.
Weston eP =67m.29s., i =67m.52s.
Palomar iP =67m.35s.a, ipPZ =68m.0s.
Riverside iPZ =67m.39s.a, epPZ =68m.5s.
Pasadena iPZ =67m.41s., epPZ =68m.5s.
Pierce Ferry iP =67m.41s., ipP =68m.6s.
Boulder City iP =67m.42s.
Ottawa e =67m.42s.
China Lake iPZ =67m.46s.a, ipPZ =68m.11s., iZ =68m.27s.
Tinemaha iPZ =67m.54s., epPZ =68m.18s.
Shasta Dam iP =68m.14s.
Hungry Horse eP =68m.28s.
College iP =73m.48s.

March 29d. 6h. 12m. 26s. Epicentre 65°·0N. 137°·0E. (as on February 12d.).

A = −·3108, B = +·2898, C = +·9052; δ = −3; h = −10;
D = +·682, E = +·731; G = −·662, H = +·617, K = −·425.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		14·5	116	e 3 43	+15	e 7 56	L	—	—	(e 7·9)
College		30·1	54	i 6 12	− 1	—	—	—	—	e 17·0
Resolute Bay	z.	36·6	20	e 7 9	− 1	—	—	e 9 30	PcP	—
Victoria	z.	51·0	57	e 9 9	+ 3	—	—	—	—	—
Hungry Horse		54·4	50	i 9 29	− 2	—	—	—	—	—
Collmberg	z.	56·3	321	e 9 40	− 5	—	—	—	—	—
Shasta Dam		58·1	61	i 9 57	− 1	—	—	—	—	—
Mineral	z.	58·7	61	e 10 1a	− 1	—	—	—	—	—
Stuttgart	z.	59·6	323	e 10 3	− 5	—	—	e 10 51	PcP	—
Tinemaha	z.	62·8	60	e 10 31	+ 1	—	—	—	—	—
China Lake	z.	64·2	60	e 10 38	− 1	—	—	—	—	—
Boulder City		65·0	57	i 10 44	0	—	—	—	—	—
Pierce Ferry		65·2	57	i 10 45	0	—	—	—	—	—
Pasadena	z.	65·4	61	e 10 46	− 1	—	—	—	—	—
Riverside	z.	65·9	61	e 10 49	− 1	—	—	—	—	—
Palomar	z.	66·6	60	e 10 55	+ 1	—	—	—	—	—
Ottawa		67·0	24	e 10 53	− 4	—	—	—	—	—
Tucson		69·8	56	e 11 14	0	—	—	—	—	—
Weston		70·7	22	e 11 18	− 2	—	—	—	—	—
Morgantown		71·8	29	e 11 22	− 4	—	—	—	—	—
Tamanrasset	z.	84·9	316	i 12 36k	− 2	—	—	—	—	—

Additional readings :—
Resolute Bay eZ = 7m.38s. and 8m.40s.
Hungry Horse i = 9m.33s.
Shasta Dam i = 10m.2s.
Mineral iZ = 10m.5s., eZ = 10m.35s.
Pierce Ferry i = 10m.49s.
Long waves were also recorded at Zi-ka-wei and Copenhagen.

March 29d. Readings also at 0h. (College, near Gandzha, Akhalkalaki, and near Mizusawa), 1h. (Samarkand, Tchimkent, near Andijan, Fergana, and Khorog), 4h. (College and Pretoria), 5h. (Fergana and Shasta Dam), 6h. (near Bogota), 7h. (near Mizusawa and near Malaga (2), 8h. (Puebla, Tacubaya, and Helwan), 9h. (Huancayo and College), 10h. (Apia and College), 11h. (Kew), 12h. (Manila), 13h. (Manila, Brisbane, College, and near Chatra), 14h. (College and near Klyuchi), 15h. (Tananarive), 17h. (near Chatra, near Akhalkalaki, Gandzha, and Tsikhlis-Dzhvari), 18h. (Hungry Horse and near Victoria (2)), 19h. (near Athens), 23h. (Fergana, near Khorog, and Stalinabad, Shasta Dam, Palomar, near Pasadena, Tucson, Riverside, and Boulder City).

March 30d. 2h. 37m. 0s. Epicentre 37°·1N. 71°·2E. Depth of focus 0·015.
(as on 1950, May 20d.).

A = +·2577, B = +·7569, C = +·6006; δ = +3; h = −1;
D = +·947, E = −·322; G = +·194, H = +·569, K = −·800.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Khorog	0·5	41	i 0 17	− 2	—	—	—	—	—
Stalinabad	2·4	307	i 0 38	− 2	i 1 6	− 4	—	—	—
Fergana	3·3	7	i 0 51	− 1	e 1 26	− 5	—	—	—
Andijan	3·8	13	0 56	− 2	i 1 36	− 7	—	—	—
Samarkand	4·2	309	e 1 5	+ 2	i 1 52	0	—	—	—
Lunacharskoe	4·5	341	e 1 7	− 1	e 1 57	− 2	—	—	—
Tashkent	4·5	341	i 1 7	− 1	i 1 56?	− 3	—	—	—
Tchimkent	5·3	347	i 1 19	+ 1	i 2 19	0	—	—	—
Naryn	5·7	39	i 1 22	− 2	i 2 24	− 4	—	—	—
Frunse	6·3	22	e 1 32	0	i 2 40	− 3	—	—	i 3·2

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rybach'e		6·5	34	i 1 35	0	2 49	+ 1	—	—	—
Mary		7·4	277	i 1 46	− 1	3 10	0	—	—	—
Almata		7·5	34	i 1 47	− 1	—	—	—	—	—
Almata II		7·8	35	i 1 51	− 1	—	—	—	—	—
Ili		8·2	31	i 1 54	− 3	i 3 33	+ 4	—	—	—
New Delhi		9·9	148	e 2 15	− 5	i 3 55	−15	2 29	PP	—
Ashkabad		10·2	279	—	—	4 12	− 5	—	—	—
Chatra		17·0	123	e 3 47	− 4	i 6 42	−12	—	—	—
Poona		18·6	172	i 4 12	+ 2	i 7 40	+11	—	—	8·5
Grozny		20·3	296	e 4 35	+ 7	—	—	—	—	—
Calcutta	E.	20·7	130	—	—	i 8 17	+ 7	—	—	—
Tiflis		20·9	292	4 38	+ 4	—	—	—	—	—
Sverdlovsk		21·0	345	4 36	+ 1	—	—	—	—	—
Borzhomi		21·9	292	e 4 51	+ 7	—	—	—	—	—
Jena	E.	43·9	308	e 8 20	+25	—	—	—	—	—
Stuttgart	Z.	45·7	305	e 8 7	− 3	—	—	—	—	—
Tamanrasset	Z.	57·6	276	e 9 42	+ 3	—	—	—	—	—
College		73·9	17	i 11 23	0	—	—	e 11 51	PcP	—

Additional readings :—
Fergana i = 1m.3s. and 1m.30s.
Andijan i = 1m.10s., 1m.40s., and 1m.58s.
Tashkent i = 1m.36s. and 2m.16s.
Tchimkent i = 1m.43s.
Almata i = 2m.19s.
Ili i = 2m.3s. and 2m.8s.
New Delhi P*E = 2m.34s., iE = 2m.40s., QEN = 2m.47s., SSEN = 4m.7s., SSSEN = 4m.17s., S_eE = 4m.54s.
Poona QE = 7m.46s., SSE = 8m.1s., SSSE = 8m.20s.
Jena eE = 8m.54s., 9m.59s., and 10m.25s.
College i = 11m.30s.

March 30d. 12h. 13m. 1s. Epicentre 29°·9N. 97°·2E.

A = −·1088, B = +·8615, C = +·4960 ; δ = +4 ; h = +2 ;
D = +·992, E = +·125 ; G = −·062, H = +·492, K = −·868.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		9·3	253	e 2 14	− 3	i 4 2	− 3	2 21	PP	4·4
Naryn		20·7	310	e 4 42	− 2	e 8 28	− 3	—	—	—
Almata		21·0	316	i 4 48	+ 1	i 8 39	+ 2	—	—	—
Rybach'e		21·1	312	e 4 48	0	—	—	—	—	—
Ili		21·3	318	i 4 47	− 3	—	—	—	—	—
Frunse		22·3	312	i 5 3	+ 2	i 9 6	+ 4	—	—	—
Andijan		22·9	304	e 5 5	− 1	i 9 16	+ 3	—	—	—
Fergana		23·2	304	i 5 8	− 1	e 9 20	+ 2	—	—	—
Kabansk		23·2	13	e 5 14?	+ 5	—	—	—	—	—
Poona	E.	24·1	247	e 5 18	0	9 22	−12	—	—	—
Bombay	E.	24·7	250	e 9 51	S	(e 9 51)	+ 7	—	—	(e 14·8)
Stalinabad		25·0	299	i 5 27	0	i 9 50	+ 1	—	—	—
Tashkent		25·3	305	i 5 29	− 1	e 9 57?	+ 3	—	—	—
Samarkand		26·5	300	e 5 43	+ 2	—	—	—	—	—
Stuttgart	Z.	66·9	314	e 10 55	− 1	—	—	—	—	—
College		73·0	24	e 11 34	+ 1	—	—	—	—	—
Hungry Horse		97·2	20	e 13 38	+ 2	—	—	—	—	—

Additional readings and note :—
Chatra PPPZ = 2m.29s., P*Z = 2m.36s., QZ = 3m.50s., SSZ = 4m.17s., SSSZ = 4m.27s.
Bombay gives S as P and L as S.
Long waves were also recorded at Calcutta, Nanking, and Zi-ka-wei.

March 30d. Readings also at 0h. (Istanbul, Hungry Horse, and near Klyuchi), 2h. (College, near Athens, and Istanbul), 3h. (Apia), 4h. (College and near Apia), 6h. (Almata, Almata II, Andijan, Fergana, Frunse, Kabansk, and College), 7h. (Tucson, College, Hungry Horse, Palisades, Weston, Huancayo, and near San Juan), 9h. (Boulder City), 10h. (Collmberg, Jena, Strasbourg, Stuttgart, and near Tacubaya), 11h. (College), 12h. (Boulder City), 13h. (2) and 15h. (Ashkabad), 16h. (Ashkabad, College, and Hungry Horse), 20h. (near Almata II), 22h. (near Akhalkalaki, Gandzha, and Tsikhlis-Dzhvari), 23h. (Akhalkalaki and Collmberg).

March 31d. 1h. 39m. 28s. Epicentre 22°·3S. 176°·8W. Depth of focus 0·020 (as on 1951, Jan. 10d.).

$A = -·9246$, $B = -·0517$, $C = -·3773$; $\delta = -9$; $h = +·5$;
$D = -·056$, $E = +·998$; $G = +·377$, $H = +·021$, $K = -·926$.

Doubtful identification.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		9·7	30	—	—	e 3 39?	−25	—	—
Tuai	N.	17·3	196	—	—	e 6 42	−16	—	—
Wellington		20·2	199	e 4 21	− 3	e 7 46	−10	—	—
Kaimata	N.E.	22·4	203	e 4 45	− 1	e 8 38	+ 2	—	—
Mount Wilson	Z.	79·2	46	i 11 49	0	—	—	—	—
Palomar	Z.	79·5	47	i 11 51	+ 1	—	—	—	—
Riverside	Z.	79·5	46	i 11 49	− 1	—	—	—	—
Fresno	Z.	79·6	43	e 11 51a	0	—	—	—	—
China Lake	Z.	80·5	45	i 11 56a	0	—	—	i 12 24	pP
Shasta Dam		80·5	38	i 11 55	− 1	—	—	—	—
Mineral	Z.	80·8	40	i 11 57k	0	—	—	i 12 25	pP
Tinemaha	Z.	80·8	44	i 11 58a	+ 1	—	—	—	—
Reno	Z.	81·3	41	e 12 0a	0	—	—	—	—
Boulder City		82·4	46	i 12 6	+ 1	—	—	—	—
Pierce Ferry		83·0	47	i 12 9	+ 1	—	—	i 12 21	pP
Tucson		83·1	51	i 12 10	+ 1	—	—	i 12 27	pP
College		89·7	11	i 12 41	0	—	—	e 13 3	pP
Hungry Horse		89·9	36	e 12 41	− 1	—	—	e 13 9	pP
Copenhagen		146·0	351	i 19 23	[+ 3]	—	—	e 19 50	pPKP
Collmberg	Z.	150·1	349	e 19 34	[+ 8]	—	—	e 20 3	pPKP
Jena		150·7	349	e 19 36	[+ 9]	—	—	—	—
Prague		150·9	345	e 19 38	[+11]	29 54	SKKS	e 20 5	PKP,
Istanbul	Z.	151·4	318	e 19 38	[+10]	—	—	—	—
Stuttgart	Z.	152·7	352	e 19 40	[+10]	—	—	e 19 53	pPKP
Strasbourg		153·5	353	e 19 42	[+11]	—	—	e 19 56	pPKP
Besançon		155·0	356	e 19 42	[+ 9]	—	—	e 20 27	pPKP
Tamanrasset	Z.	177·8	—	i 19 54	[+ 3]	e 25 32	PP	e 21 44	PPP,

Additional readings :—
Mineral iZ = 12m.8s.
Jena eEN = 19m.47s. and 20m.26s., eN = 21m.20s.
Prague e = 19m.57s.
Besançon e = 20m.1s.
Tamanrasset eZ = 20m.24s., ePcP,PKPZ = 28m.43s.

March 31d. 6h. 22m. 7s. Epicentre 18°·6S. 179°·1W. Depth of focus 0·090.

$A = -·9483$, $B = -·0149$, $C = -·3170$; $\delta = -2$; $h = +5$;
$D = -·016$, $E = +1·000$; $G = +·317$, $H = +·005$, $K = -·948$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		8·5	57	e 2 0	− 4	3 36	− 8	—	—
Wellington		23·2	193	i 4 27	+ 3	—	—	—	—
Kaimata	N.E.	25·2	197	4 43	+ 2	—	—	—	—
Christchurch		25·8	194	e 5 0	+13	—	—	—	—
Brisbane	Z.	27·1	246	i 4 56a	− 2	—	—	i 5 26	PP
Pasadena	Z.	78·2	48	i 11 0k	+ 1	—	—	—	—
Fresno	Z.	78·5	45	e 10 59k	− 2	—	—	—	—
Riverside	Z.	78·6	48	i 11 4	+ 2	—	—	e 13 7	pP
Palomar	Z.	78·7	49	i 11 3	+ 1	—	—	—	—
Shasta Dam		79·1	41	i 11 4	0	—	—	—	—
China Lake	Z.	79·5	47	i 11 6k	0	—	—	e 13 10	pP
Reno	Z.	80·0	43	e 11 9k	0	—	—	—	—
Boulder City		81·4	48	i 11 17	+ 1	—	—	—	—
Pierce Ferry		82·1	48	i 11 20	+ 1	—	—	—	—
Tucson		82·6	53	i 11 24	+ 2	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
College		86·6	13	i 11 37	− 4	—	—	—	—
Hungry Horse		88·3	38	i 11 48	− 1	—	—	—	—
Bombay		112·4	283	e 12 53?	?	—	—	—	—
Pretoria	z.	128·6	212	—	—	i 26 59	SKKS	—	—
Rathfarnham C.	z.	144·9	7	i 18 24	[− 6]	—	—	e 19 10	PKP_2
Raciborzu	z.	145·7	340	18 32	[+ 1]	—	—	—	—
Collmberg	z.	146·0	346	i 18 29	[− 2]	—	—	—	—
Prague		146·8	343	e 22 35	PP	—	—	—	—
Istanbul	z.	147·1	320	e 18 37	[+ 4]	—	—	—	—
Stuttgart	z.	149·2	350	e 18 37	[+ 1]	—	—	e 20 57	PKP_2
Strasbourg		149·6	352	i 18 44k	[+ 7]	—	—	—	—
Besançon		151·1	354	e 18 43	[+ 4]	—	—	—	—
Tamanrasset	z.	174·0	—	e 19 3	[+ 2]	e 24 29	PP	e 20 36	PKP_2

Additional readings :—
College e = 11m.54s., i = 12m.33s.
Prague e = 22m.41s.
Stuttgart iPKPZ = 18m.42s., epPKP?Z = 18m.47s.
Strasbourg i = 18m.50s.
Besançon e = 18m.55s.
Tamanrasset epPKPZ = 19m.30s., e = 30m.22s.

March 31d. 9h. 20m. 34s. Epicentre 60°·4N. 153°·6W. Depth of focus 0·030.

A = −·4447, B = −·2207, C = +·8681 ; δ = +6 ; h = −9 ;
D = −·445, E = +·896 ; G = −·778, H = −·386, K = −·496.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		5·2	28	i 1 15	− 3	i 2 11	− 8	—	—	i 3·0
Sitka		10·1	102	i 2 15	− 6	i 4 6	− 6	e 4 22	Q	i 7·3
Victoria	z.	21·0	110	i 4 29k	+ 2	—	—	—	—	—
Seattle		22·1	110	i 4 42k	+ 5	i 6 0	sP	i 5 37	pP	—
Resolute Bay		25·1	31	i 5 6	0	e 9 17	+ 5	i 5 44	pP	—
Hungry Horse		25·6	99	i 5 11	+ 1	i 11 55	ScP	i 5 49	pP	—
Saskatoon		26·8	86	—	—	e 9 38	− 1	—	—	—
Shasta Dam		27·6	121	i 5 29	0	e 9 59	+ 7	i 8 39	PcP	—
Mineral	z.	28·2	120	i 5 34a	0	i 12 8	ScP	i 6 16	pP	—
Reno		29·6	118	e 5 48k	+ 2	—	—	—	—	—
Berkeley	z.	30·0	123	i 5 50	0	i 12 9	ScP	e 6 30	pP	—
Lick		30·7	123	e 6 58	pP	—	—	—	—	—
Logan		31·5	106	i 6 5	+ 2	e 12 15	ScP	i 6 43	pP	—
Fresno		32·0	121	e 6 8	+ 1	e 7 26	PP	e 6 47	pP	—
Tinemaha	z.	32·4	119	i 6 12k	+ 1	i 12 17	ScP	i 6 52	pP	—
China Lake	z.	33·7	119	i 6 21	− 1	i 12 20	ScP	i 7 2	pP	—
Boulder City		34·7	116	i 6 27	− 3	i 12 26	ScP	i 8 59	PcP	—
Pasadena	z.	34·9	122	i 6 32k	0	i 12 25	ScP	i 7 15	pP	—
Pierce Ferry		35·0	115	i 6 34	+ 1	i 12 26	ScP	i 7 13	pP	—
Riverside	z.	35·3	122	i 6 36k	+ 1	i 12 25	ScP	i 7 18	pP	—
Tucson		39·7	114	i 7 13	+ 1	i 12 44	ScP	e 7 59	pP	—
St. Louis		44·4	89	i 7 51	+ 1	e 17 25	SS	i 9 30	PcP	—
Scoresby Sund	z.	45·0	21	i 7 55k	0	—	—	—	—	—
Ottawa		46·4	71	e 8 5	− 1	—	—	—	—	—
Cleveland		46·6	80	i 8 7a	0	i 14 41	+ 3	—	—	—
Shawinigan Falls	N.	46·9	68	e 8 10	0	—	—	—	—	—
Pittsburgh	z.	48·1	79	i 8 13	− 6	—	—	—	—	—
Morgantown		48·8	80	i 8 23	− 1	—	—	e 9 6	pP	—
Pennsylvania	N.	48·9	77	—	—	i 15 14	+ 4	i 17 53	ScS	—
Palisades		50·6	74	i 8 38	0	—	—	i 9 22	pP	—
Fordham		50·7	74	i 8 40	+ 1	—	—	—	—	—
Weston		50·8	71	i 8 40	+ 1	—	—	i 9 22	pP	—
Kabansk		50·9	309	8 41	+ 1	15 44	+ 6	—	—	—
Irkutsk		51·6	310	e 8 44	− 1	e 15 52?	+ 4	—	—	—
Tacubaya		56·0	111	e 9 17	0	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sverdlovsk		60·0	340	i 9 46	+ 1	17 42	+ 4	—	—	—
Collmberg	z.	68·1	9	e 10 37	− 1	—	—	e 11 23	pP	—
Ili		68·1	323	e 10 36	− 2	—	—	—	—	—
Almata II		68·6	323	i 10 40	− 1	—	—	—	—	—
Almata		68·7	323	10 40	− 1	—	—	—	—	—
Prague		69·5	8	e 11 44	pP	e 12 8	sP	—	—	—
Strasbourg		70·3	13	e 11 37	pP	—	—	—	—	—
Stuttgart	z.	70·3	12	e 10 50	− 1	—	—	e 11 36	pP	—
Naryn		70·7	323	e 10 53	0	—	—	—	—	—
Besançon		71·4	14	e 10 57	− 1	—	—	e 11 42	pP	—
Tchimkent		71·7	328	i 10 59	0	—	—	—	—	—
Andijan		72·4	325	i 11 3	0	e 20 12?	+ 5	—	—	—
Tashkent		72·7	328	e 11 3	− 2	e 20 13?	+ 2	—	—	—
Fergana		72·9	325	i 11 5	− 1	—	—	—	—	—
San Juan		73·0	83	i 11 6	− 1	—	—	i 11 22	PcP	—
Samarkand		74·9	329	e 11 18	0	—	—	—	—	—
Belgrade	z.	75·0	5	e 12 5k	pP	—	—	e 12 42	pP	—
Stalinabad		75·4	327	i 11 20	− 1	e 20 45	+ 4	—	—	—
Tiflis		77·1	346	e 11 31	+ 1	—	—	—	—	—
Borzhomi		77·2	348	e 11 30	− 1	—	—	—	—	—
Mary		78·1	332	i 11 36	0	—	—	—	—	—
Tamanrasset	z.	95·4	20	e 13 47?	pP	—	—	e 17 41?	PP	—
Pretoria	z.	145·4	356	i 19 12	[+ 1]	—	—	—	—	—
Pietermaritzburg	z.	149·1	353	i 19 22	[+ 5]	—	—	—	—	—

Additional readings :—
Seattle i = 5m.20s. and 5m.45s.
Resolute Bay e = 6m.8s., eEN = 9m.49s.
Hungry Horse iPcP = 8m.35s.
Shasta Dam i = 5m.35s., iScP = 11m.59s.
Mineral iZ = 5m.38s. and 8m.40s.
Logan ePP = 7m.23s.
Tinemaha iPcPZ = 8m.53s.
China Lake iPcPZ = 8m.54s., iScSN = 16m.23s.
Pasadena iPcPZ = 8m.59s.
Pierce Ferry iScP = 11m.54s.
Riverside iPcPZ = 9m.0s.
Tucson ePcP = 9m.15s.
St. Louis e = 7m.57s. and 8m.42s., ePP = 9m.41s.
Pennsylvania eN = 18m.55s.
Prague e = 12m.24s.
Belgrade eZ = 14m.17s.
Long waves were also recorded at Seven Falls.

March 31d. 23h. 34m. 17s. Epicentre 36°·7N. 139°·7E. (as on 1949, December 27d.).

Intensity VI at Nikko ; V at Horigome, Ashio, Katakura, and Shimodate ; IV at Utunomiya, Tokyo, Tochigi, Awano, Batto, Kasama, Makabe, Ose, and Manabe ; II-III at Tukubasan, Mito, Maebasi, Kumagaya, Yokohama, Minato, and Hokota.
Epicentre as adopted. Depth 10km.

Seismo. Bull. Cent. Met. Obs., Japan, April, 1951. Tokyo, 1951, p. 83, with macroseismic chart.

$A = -\cdot6129$, $B = +\cdot5198$, $C = +\cdot5951$; $\delta = -2$; $h = 0$;
$D = +\cdot647$, $E = +\cdot763$; $G = -\cdot454$, $H = +\cdot385$, $K = -\cdot804$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Utunomiya	0·2	138	0 6k	− 4	0 9	− 7
Kumagaya	0·6	205	0 12a	− 3	0 23	− 3
Maebasi	0·6	239	0 11a	− 4	0 20	− 6
Tukubasan	0·6	146	0 12	− 3	0 20	− 6
Mito	0·7	117	0 15k	− 2	0 25	− 3
Inawasiro	0·9	21	0 21	+ 1	—	—
Titibu	0·9	215	0 17	− 3	0 30	− 4
Oiwake	1·0	248	0 19	− 2	0 32	− 4
Onahama	1·0	76	0 24	+ 3	0 37	+ 1
Tokyo	1·0	177	0 21	0	0 35	− 1

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Hukusima		1·2	30	0 24	0	—	—
Matusiro		1·2	263	0 23	− 1	0 37	− 4
Nagano		1·2	268	0 23	− 1	0 40	− 1
Takada		1·2	289	0 24	0	—	—
Tyosi		1·3	136	0 25	0	0 42	− 2
Yokohama		1·3	182	0 29 a	+ 4	0 45	+ 1
Hunatu		1·4	212	0 27	0	0 45	− 1
Kohu		1·4	221	0 26	− 1	0 45	− 1
Matumoto		1·5	251	0 32	+ 4	0 45	− 4
Aikawa		1·7	319	0 31	0	0 54	0
Misima		1·7	201	0 32	+ 1	0 54	0
Mera		1·8	177	0 39	+ 7	1 2	+ 6
Sendai		1·8	31	0 33	+ 1	0 59	+ 3
Shizuoka		2·0	211	0 36	+ 1	1 4	+ 2
Toyama		2·0	270	0 38	+ 3	1 3	+ 1
Kanazawa		2·4	266	1 0	S	(1 0)	−12
Gihu		2·7	241	0 50	+ 5	1 19	0
Mizusawa	E.	2·7	25	1 11	?	1 35	S_E
Nagoya		2·7	235	0 46	+ 1	1 21	+ 2
Akita		3·0	6	1 40	S_E	—	—
Hikone		3·1	243	1 29	S	(1 29)	0
Osaka		3·9	240	1 17	P_E	2 10	S_E
Owase		3·9	228	1 6	+ 4	—	—

March 31d. Readings also at 0h. (Pretoria and near Ashkabad), 1h. (near Klyuchi), 2h. (Apia (2), Akhalkalaki, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Pierce Ferry, Fresno, Reno, Mineral, Shasta Dam, Hungry Horse (2), College, Collmberg, Stuttgart, and Tamanrasset), 4h. (near Copiapo), 6h. (Hungry Horse), 8h. (Helwan, Ksara, and Tamanrasset), 9h. (Hungry Horse, Almata, near Klyuchi, near Ashkabad (2), near Khorog, near Istanbul (2), near Yalta (2), and near Alicante), 11h. (near Khorog), 13h. (near Akhalkalaki), 14h. (College), 15h. (College, Stuttgart, and near Klyuchi), 17h. (near Alicante (4), near Andijan, Fergana, Khorog, and Stalinabad), 18h. (Frunse, Ili, Rybach'e, Lunacharskoe, Tashkent, near Naryn, and Tchimkent), 19h. (near Ashkabad and near Stalinabad), 21h. (College), 22h. (Mount Wilson, Palomar, China Lake, Tinemaha, Tucson, Pierce Ferry, Hungry Horse, Collmberg, near Istanbul, near Yalta, and near Mizusawa), 23h. (College).

The scanned images of the bulletins of the International Seismological Summary (ISS) have been obtained as part of a global earthquake relocation project (Villaseñor et al., 1997) initiated with funding from the US National Science Foundation through grant EAR-9725140 and collected by SGA Storia Geofisica Ambiente (Bologna) on behalf of the Istituto Nazionale di Geofisica e Vulcanologia (Rome), in the frame of Euroseismos project.

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.

Villaseñor, A., E.A. Bergman, T.M. Boyd, E.R. Engdahl, D.W. Frazier, M.M. Harden, J.L. Orth, R.L. Parkes, and K.M. Shedlock*, Toward a comprehensive catalog of global historical seismicity,* Eos Trans. AGU, vol. 78, no. 50, pp. 581, 583, 588, 1997.