

SEISMOLOGICAL BULLETIN FOR JANUARY 1931

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T_1 (SEC.)	PENDULUM FREE PERIOD T (SEC.)	DAMPING CONSTANT ρ^2	$A_k / \pi L$ (SEC.)
N	1930 SEPT. 9	24.68	25.2	-0.01	47.3
E		24.80	25.2	-0.04	44.2
Z		13.04	13.5	+0.12	106

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK MORRISON ; TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY. SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE.	PHASE.	G.M.T.			PERIOD. SEC.	AMPLITUDE.			Δ KM.	REMARKS.
		HR.	MIN.	SEC.		An	Ae	Az		
JAN. 2	L M F	0	36 49 1 30							
JAN. 2	iPz S ₂ P ₂ S iS _{NE} SR ₁ L M ₁ M ₂ L ₂ M F	10	1 12 12 17 26.7 31 32 11 50 54 12 50	44 10 21 54	26 27	+47	-51	9540	Dilatation. Pacific Ocean near Mexico. 15° N, 108.5° W, according to U.S.A. } Via antipodes.	
JAN. 3	-								No records from 3 ^h 50 ^m to 7 ^h 20 ^m .	
JAN. 4	e(S) _N iL _{NE} M F	0	9 12 12 30	36 8 53	17	-29			Felt in Corinth and Athens.	
JAN. 7	eL F	2	38 50							
JAN. 11	e F	19	29 35							
JAN. 12	iS _{EZ} iZ F	15	16 22 30	29 20						



DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			KM.
		HR.	MIN.	SEC.		SEC.	A _n	A _e		A_{z}
						μ	μ	μ	
JAN. 12	e F	16	5 15						
JAN. 12	e(P) _z L F	20 21 22	45.7 9 20						
JAN. 15	iP _z iPNE iPR _{1z} iPR _{1E} iS iSR _{1E} LN LE Lz M ₁ M ₂ M ₃ M ₄ M ₅ M ₆ M ₇ M ₈ M ₉ M ₁₀ M ₁₁ F	2 3 6 6 13 18 24.5 28 29.3 31 31 31 34 34 35 35 37 40 40 42 6	3 3 22 37 11 24 24.5 13 29.3 35 43 56 29 29 40 56 12 18 25 23 30						
							+470*		
				30				+470	
				32		+330			
				32				-370	
				(29)	>410 [†]				
				23				+350	
				24			+490*		
				22				-370	
				(26)	>360 [†]				
				18				-320	
				16				+320	
JAN. 15	e _z L M F	21 22	36 46 58 30	51	15	+35			
JAN. 15/16	eN L F	23 1	34.0 42 20						
JAN. 16	e(P) _z L F	19 20	32.2 59 40						
JAN. 17	L M ₁ M ₂ M ₃ F	3 4	23 33 37 37 30	35 41 44	20 16 14	-53	-40	-39	
JAN. 19	eL F	17	22 50						
JAN. 24	eL F	14 15	38 30						

9010

Dilatation.
Amplitudes of iP as read
N E Z
+1.75 -4.15 -10.0 mm.
Azimuth = 291°, giving
epicentre near 20°N, 101°W.
Destructive in Mexico.

Bombay telegraphs:
iP - 2^h 10^m 13^s
S-P 495 sec.
Δ 6800 km.

* Negative maxima off
chart
† Positive and negative
maxima off chart.

14.5°N, 96°W according
to J.S.A.

Confused by micro-
seisms and wind.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae			Az	KM.
JAN. 27	eP	20	20	59					8200	Amplitudes of P as read N E Z (+14) (+37) -4.0 mm. Azimuth about 70°; Epicentre near 25°N, 95°E North Burma. Bombay telegraphs: iP - 20 ^h 14 ^m 15 ^s S-P - 240 sec. Δ - 2400 km. * Several maxima off the chart.
	iZ		21	5						
	iPcPe		21	31						
	iPR ₁		23	45						
	ePR ₂		25	37						
	iSNE		30	29						
	L		45							
	M ₁		46	22	42	+520				
	M		50-57		(23)	>400*				
M		53	36	23		+400				
F	23	50								
JAN. 28	iPz	5	59	27					2010	Destructive at Koritza, Albania.
	iS	6	2	51						
	iLNE		4	54						
	M		5	33	15	-44				
	F		20							
JAN. 28/29	iPR _{1z}	21	43	16					(12500)	Pacific Ocean, North of New Guinea. 15°N, 144°E, according to U.S.C. + G.S. broadcast message. Bombay telegraphs: iP. 21 ^h 35 ^m 19 ^s S-P - 540 sec. Δ - 7600 km.
	eScPcS		50	38						
	e(S)		51	7						
	iPS		53	0						
	ePPS		54	(2)						
	iSR ₁		58	57						
	LNE	22	11							
	Lz		17							
	M ₁		20	19	32		-180			
	M ₂		22	37	30		+155			
	M ₃		25	4	28		-145			
	M ₄		28	43	22			-100		
	M ₅		28	50	22		-120			
F	0	50								
JAN. 29	eL	1	31							
	F		50							
JAN 29	eL	17	50							
	F	18	10							

F. J. Whipple.
Subt.
6. 2. 31.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**SEISMOLOGICAL BULLETIN FOR FEBRUARY 1931.**

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914)
OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T ₁ (SEC).	PENDULUM FREE PERIOD T (SEC).	DAMPING CONSTANT μ^2	$\frac{AK}{\pi L}$ (SEC. ⁻¹)
N	1930 SEPT. 9	24.68	25.2	-0.01	47.3
E		24.80	25.2	-0.04	44.2
Z		13.04	13.5	+0.12	106.

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK (MORRISON) ;
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE.	PHASE.	G.M.T.			PERIOD. SEC.	AMPLITUDE.			Δ KM.	REMARKS.
		HR.	MIN.	SEC.		A _n μ	A _e μ	A _z μ		
FEB. 2/3	i P ₂ '	23	6	53				(18900)	Dilatation.	
	i P ₂ z		8	5	...	...	...	...	P ₂ ' by path of greater deviation.
	i P ₂ eSN		9	57						
	i P ₂ R ₁ NZ		11	51						
	e S ₂ eP ₂ eS		14	7					Destructive in New Zealand (Napier & Hastings etc)	
	e P ₂ R ₂ NE		15	50					39°S., 177°E according to J.S.A.	
	i S ₂ eP ₂ eSN		18	32						
	i S ₂ eP ₂ eSP		22	6						
	i S ₂ R ₁ E		32	27						
	i N		34	58						
	i S ₂ R ₁ E		36	50	...	...	...	...	By path corresponding to $\Delta > 180^\circ$
	i N		38	44						
	i S ₂ R ₂ E		39	58						
	i S ₂ R ₂ E		43	58	...	...	...	...	ditto.
	i L E		57	24						
	L NZ	0	7							
	M ₁		16	48	24		+150		Bombay telegraphs :	
	M ₂		20	7	23	-165			i P - 23 ^h 4 ^m 41 ^s	
	M ₃		21	22	21			-220	S-P - 656 sec.	
	M ₄		22	41	23		-200		Δ - 9800 km.	
	M ₅		24	17	22	-180				
	M ₆		24	34	20			+220		
	M ₇		25	4	21		+150			
	M ₈		26	2	19			+220		
	M ₉		26	20	21	-175				
	M ₁₀		28	27	21		+125			
	F	3	55							

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FEBRUARY 1931

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae		
						μ	μ	μ	KM.	
FEB. 18	eL F	21	25 35							
FEB. 19	eZ eNE L F	18	40 6.1 28 30							
FEB. 20	iZ iP i e e(PR) ₁ _{NE} e(PR) ₂ _{NZ} iS iSP iE iN L M ₁ M ₂ M ₃ F	5	44 44 46 44 47 50 54 41 27 31 4.4 5 54 6 25	40 42 1 44					7990	Dilatation. Amplitudes of iP as read in mm. N E Z +1.2 +0.9 -5.5 Azimuth = 39° ± 5°. Probably deep focus (0.06); corrected Δ = 8600 km, giving epicentre near 39° N, 126° E. (Korea) Bombay telegraphs - iP 5 ^h 52 ^m 43 ^s S-P 448 sec. Δ 5900 km.
		6			20	-24				
					22			+27		
					23		+12			
FEB. 25	eL F	18	34 50							
FEB. 27	eE e LNE MN F	10	2 6 30 44 30	44 1						
		11								

F. B. Whipple.

Supt.
5. 2. 31.

SEISMOLOGICAL BULLETIN FOR MARCH 1931.

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N	1930, SEPT 9	24.7	25.2	-0.01	47.3
E		24.8	25.2	-0.04	44.2
Z		13.0	13.5	+0.12	106.

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK MORRISON.
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SEISMOLOGIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		A _n	A _e	A _z		
					SEC.	μ	μ	μ	KM.	
MAR 2	e _Z	2	38	6						
	i _Z		38	11						
	i _Z		38	15						
	i _{NZ}		41	45						
	e _N		52	7						
	e _E	3	1	1						
	e _E		21	38						
	L _{NE}		24							
	M _N		36							
	F	4	25							
5	e _L	18	54							
	F	19	5							
7	i _P	0	21	7					2070	Compression.
	i _{SNE}		24	36						Destructive in the BALKANS.
	i _{SZ}		24	38						Amplitudes of P _{as} read in mm:
	i _{LZ}		26	11						N. E. Z.
	i _{LN}		26	32						+1.3 -3.4 +3.5
	i _{LE}		26	45						Azimuth about 110°.
	M ₁		27	42	11	+54				Epicentre near 42°N, 23°E.
	M ₂		28	42	14		+42			
	M ₃		29	5	8			-49		
	F		50							
8	i _P	1	54	41					2070.	Destructive in the BALKANS.
	i _S		58	10						Amplitudes of P _{as} read in mm:
	L _N		59	19						N. E. Z.
	L _E		59	33						+10.6 -18.7 +29.7
	M ₁	2	0-1		13	(260)		+98		Azimuth about 118°.
	M ₂		0	25	8			+310		
	M ₃		1	25	18			+175		
	M ₄		1	58	15		+170			
	M ₅		2	32	10					Epicentre near 41°N, 21°E.
	F	3	50							

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MARCH 1931.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae		
MAR. 8	eL F	13 14	21 0							
9	iP iPR ₁ iS PS _N SR _{IE} e _N L _{NE} L _Z M ₁ M ₂ M ₃ M ₄ F	4 6	1 4 11 12 17 17.9 26 31 32 34 39-42 41 45	22 31 39 46 17 8					9150	Compression. Felt in JAPAN. Epicentre 42°N, 141°E. (Strasbourg) Bombay telegraphs :- iP. 3 ^h 59 ^m 25 ^s . iS. 4 7 50. Δ. 6800 KM. † Negative maximum off chart. * Positive and negative maxima off chart.
11	eP _Z eS _{EN} L _{NE} M ₁ L _Z M ₂ M ₃ M ₄ M ₅ F	12 13 15	40 51 14 16 20 29 30 30 37 10	(43) 56 22 53 36 49 30					(10330)	Bombay telegraphs :- iP. 12 ^h 37 ^m 29 ^s iS. 46 11 Δ. 7200 KM.
12	eZ L _{NE} L _Z F	11 12	7 27 33 25							
12	eL F	20 	1 30							
12	e F	21 22	58 10							Very small.
15	eL F	17 	18 40							Confused by microseisms.
18	eP PR ₁ S ₂ P ₂ S PPS i _Z SR ₁ L M ₁ M ₂ M ₃ M ₄ M ₅ M ₆ M ₇ F	8 9 11	16 20 27 30 33 36 51 0 2 2 5 7 8 13 30	37 51 13 19 23 7 35 19 19 29 24 53 51					(11750)	CHILE. 34°S, 72°W. (U.S.C.G.S.)

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DATE	PHASE	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae		
						μ	μ	μ	KM.	
MAR. 18	e(P) _z	20	28						(12000)	Destructive in the PHILIPPINES. 6°N., 128°E. (Strasbourg.)
	e _c PS		35	23						
	e _c PS		38	27						
	e		51	17						
	L _{NE}	21	1							
	L _z		6							
	M ₁		7	10	39	-75				
	M ₂		9	29	33		+32			
	M ₃		16	0	23		+33			
	M ₄		16	20	23	-39				
	M ₅		24	16	17			-14		
	F	23	0							
19	iP	6	38	31					9430	Compression. FORMOSA. 23°N., 123°E. (Strasbourg.) Bombay telegraphs:- iP. 6 ^h 33 ^m 23 ^s . iS. 39. 51. Δ. 4700 KM.
	iPR ₁		42	4						
	iS _c PS		48	48						
	S		49	17						
	PS		50	34						
	SR _{1NE}		55	35						
	L _{NE}	7	10							
	L _z		14							
	M ₁		19	46	24		-36			
	M ₂		22	33	23	+43				
	M ₃		24	35	18		+31			
	M ₄		24	38	16			-36		
	M ₅		24	49	15	+30				
	M ₆		26	31	18			-31		
	F	8	55							
22	e	4	0							
	F		5							
22	eL	15	58							
	F	16	15							
24	eL	13	17							
	F		30							
28	e _{NZ}	12	54	0						Bombay telegraphs:- h m s iP. 12.48.50. iS. 57.5. Δ. 6700 KM. No record of E-W component.
	e _{NZ}		57	22						
	e _{NZ}		58	47						
	i _N	13	5	19						
	i _N		8	55						
	e _{NZ}		14	58						
	e _z		15	43						
	i _N		16	11						
	e _N		20	51						
	L _N		28.8							
	L _z		36							
	M ₁		39	9	38	-55				
	M ₂		42	34	31	-37				
	M ₃		51	54	17			-20		
	M ₄		54	14	18			+27		
	M ₅	14	49	32	19			+15		
	F	15	35							

SEISMOLOGICAL BULLETIN.



From the ISC collection scanned by SISMOS

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae			Az
MAR. 29	e(P)	18	4	19		μ	μ	μ		
	eL		13							
	F		55							
30	e	14	33							
	F		50							
31	e _Z	16	17							Destructive in MANAGUA, NICARAGUA.
	L _N		36							
	L _{EZ}		40							
	M		51							
	F	17	20							

F. W. Whipple.
Supt.
2.4.31.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

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		HR.	MIN.	SEC.		A_n μ	A_e μ	A_z μ		
Apr. 1	e	13	55						Small; record disturbed by wind and microseisms. No records :- 22 ^h 59 ^m to 9 ^h 16 ^m .	
	F	14	5							
1/2	-	-	-	-						
3	eEZ	2	9	19						
	eE		19	47						
	eN		20	13						
	eE		21	24						
	L F	3	25							
3	e	8	10							
	F		40							
3	e ₂	22	5							
	L		14							
	M		14	54	21		-8			
	F		45							
3/4	L _{NZ}	23	37	54						
	e ₂		40	29						
	e _{NE}		40	33						
	L F	1	57 0							
5	e _{NE}	22	35							
	F		40							
6	i ₂	7	8	51						
	e		11	8						
	i _{NE}		12	16						
	L _{NE}		48							
	L ₂		54							
	M ₁		58	3	25		-10			
	M ₂		58	38	27	-22				
	M ₃ F	8 9	1 40	7	26			+20		

SEISMOLOGICAL BULLETIN.

APRIL, 1931.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	Am	As			Az
						μ	μ	μ	KM.	
Apr. 6	e F	13	5 15							
7	e F	0 1	56 7							
7	eL F	8	35 55							
8	e eE LNE Lz F	19 20	33 39 4 12 35	19 (10)						
9/10	iP iS iS iS LE LNz M F	23	13 23 23 43 45 48 25	29 35 55	27	-9	-6		9310	Compression.
11	e F	1	31.5 36							Not very distant.
11	e eL F	16	12 18 40							
12	e e eNE LNE Lz M F	2 3 4	21 24.3 43.9 23 29 29 25	17	20	-5				
13/14	-	-	-	-						No records:- 23 ^h 13 ^m to 9 ^h 8 ^m .
15	iPZE eSNE L M ₁ M ₂ M ₃ M ₄ F	17	3 6 7.7 8 8 8 9 18	9 41 39 40 44 16	19 13 18 13	+19 +20	-25		2100	Compression. Amplitudes of iPas read in mm:- N. E. Z. 0.0 +1.6 +1.0 Azimuth about west giving epicentre near 48°N, 30°W. (Atlantic Ocean north of the Azores.)
19	e eL F	2 3	23 41 40							
20	e eL F	20 21	43 47 5							
21	e F	14	24.6 30							Not very distant.

SEISMOLOGICAL BULLETIN.

..... APRIL,

1931.

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		HR.	MIN.	SEC.		SEC.	An	As		
						μ	μ	μ	KM.	
Apr. 22	e _z	0	8.2							
	e _N		15.2							
	e _z		22.5							
	e _{LE}	1	9							
	e _{LNZ}		12							
	M ₁		27	19	20	-4	+5			
	M ₂		30	10	19					
F	2	40								
24	i _z	17	41	26						
	i		43	44						
	i _z		44	49						
	i _{NE}		44	51						
	L _{NE}		16							
	M ₁		24	9	35		-42			
	L _z		26							
	M ₂		31	11	29	-65	+34			
	M ₃		31	46	27			-51		
	M ₄		32	58	27			+42		
	M ₅		38	46	23					
	M ₆		38	51	24	+39				
	F	20	40							
26	e	5	10							
	F		30							
26	e	16	38							
	F		50							
27	i _{Pz}	16	57	29					3660	
	i _{PE}		57	30						
	e _{PR}		58	45						
	i _S	17	2	56						
	e _z		5	27						
	i _{LN}		5.6							
	L _E		7							
	L _z		12							
	M ₁		14	51	19	+41				
	M ₂		15	17	15		+27			
	M ₃		15	19	15			-32		
F	19	0								

Dilatation.
 Amplitudes of i_P as read
 in mm:-
 N. E. Z.
 0.0 +1.0 -2.3
 Azimuth about east,
 giving epicentre near
 41° N., 45° E. (Caucasia)

J. G. Whipple
 Supt.
 4.5.31.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLANDSEISMOLOGICAL BULLETIN FOR MAY, 1931.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914)
OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T_1 (SEC).	PENDULUM FREE PERIOD T (SEC).	DAMPING CONSTANT μ^2	$Ak / \pi L /$ (SEC).
N	1930, SEPT. 9	24.7	25.2	-0.01	47.3
E		24.8	25.2	-0.04	44.2
Z		13.0	13.5	+0.12	106.

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK (MORRISON) ;
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	A_n	A_e			$A_z$
						μ	μ	μ	KM.	
May, 1	e _Z	22	48	12						Venezuela. 8° N., 70° W. (U.S.C.G.S.)
	e _{NE}	28	5.9							
	e _L		13							
	F		55							
6	e _L	16	23							
	F	17	15							
6	e	17	57							
	F	18	6							
6	e	20	35							
	F		51							
7	e	1	14							
	F		24							
7	e	6	35							
	F		55							
8	e	18	2							
	F		15						Very small.	
9	e _Z	11	8							
	e _{LNE}		11							
	e _{LZ}		16							
	F		50							
10	e	10	57							
	F	11	2							
10	e _{NE}	20	6							
	L		24							
	F		55							



SEISMOLOGICAL BULLETIN.

MAY, 1931.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae			Az
						μ	μ	μ	KM.	
May 12	iP _Z	1	48	46					8290	
	iS _N		58	20						
	eS _E		58	21						
	eNE		58	53						
	L _{NE}	2	7.9							
	L _Z		15							
	F	3	0							
12	e	10	41							
	F	11	0							
13/14	eL	23	52							
	F	0	10							
16	e	15	57							Very small.
	F	16	5							
16	iP _{EZ}	20	59	53					9050	Southern Mexico. 16°N., 96°W. (U.S.C.G.S.)
	i _Z	21	0	5						
	eS		10	6						
	L _{NE}		23							
	L _Z		26							
	M ₁		32	23	24		+7			
	M ₂		35	19	20			-5		
	M ₃		36	42	22	+4				
	F	22	45							
17	e	10	15							} Very small.
	F		35							
17	e	13	31							
	F	14	10							
17	e	15	45							
	F	16	0							
18	e	11	32							
	F		40							
20	iP _Z	2	27	0					1900	Amplitudes of iP as read in mm: N. E. Z. +30.6 +25.0 +35.2 Azimuth = 221°, giving epicentre near 37°N., 14°W. (Eastern Atlantic Ocean.) Large movements of horizontal components, 30.5 ^m to 34 ^m ; trace too faint for these to be followed. † Negative maxima off chart. Bombay telegraphs :- iP. 2 ^m 34 ^m 52 ^s . iS. 44 44. Δ 8600 Km.
	iP _{NE}		27	1						
	i _N		27	54						
	i		29	52						
	i _N		30	2						
	iS _N		30	12						
	iS _E		30	13						
	iS _Z		30	18						
	i _E		30	22						
	i _Z		30	35						
	iL _Z		31	52						
	M ₁		33	26	13			+250 [†]		
	M ₂		37	34	12	-260		+190 [†]		
	M ₃		38	5	12	+230				
	M ₄		39	31	12					
	M ₅		40	2	11			-250 [†]		
	M ₆		40	55	15			+195 [†]		
eL ₂	5	27								
M ₇		31	48	25			+5			
	F	6	30							

SEISMOLOGICAL BULLETIN.



From the ISC collection scanned by SISMO5

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae			Az
						μ	μ	μ	KM.	
May 20	eP _Z ⁱ	22	12.6						(11,500)	Pacific Ocean off Chile. 28°S., 74°W. (U.S.C.G.S.)
	eS _C ⁱ		18.5							
	eS _E ⁱ		41							
	L _{NE}		48							
	L _Z	23	25							
	F									
24	e	0	38							
	eL _{NE}	1	2							
	eL _Z		9							
	M _N		10	23	23	+4				
	F		45							
27	e	1	24							
	F		35							
27	e	6	45							
	F		7	10						
27	e	7	32							
	L		44							
	F		8	5						
27	e	11	7							
	F		30							
28	e	5	28							
	F		40							
28	eE _Z	18	45	54						
	eL	19	20							
	F	20	15							

J. W. Whipple
 Subst.
 2-6-31.



KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR JUNE, 1931.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914)
OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T ₁ (SEC.)	PENDULUM FREE PERIOD T (SEC.)	DAMPING CONSTANT μ ²	Ak / π L (SEC.) ⁻¹
N	1930, SEPT. 9	24.7	25.2	-0.01	47.3
E		24.8	25.2	-0.04	44.2
Z		13.0	13.5	+0.12	106

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK MORRISON ;
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE.	PHASE.	G.M.T.			PERIOD. SEC.	AMPLITUDE.			Δ KM.	REMARKS.
		HR.	MIN.	SEC.		An μ	Ae μ	Az μ		
June, 1	e _Z	12	17	12						
	e _Z		26	4						
	e _{NE}		31	54						
	L _{NE}		53							
	L _Z	13	1							
	M ₁		11	5	22	+4				
	M ₂		11	19	22			+3		
	M ₃		12	8	24		+5			
	F	14	10							
	2	e	3	2						
	L _{NE}		22							
	M		25	1	22		-3			
	L _Z		28							
	F		45							
2	eL _E	5	1							
	eL _{NZ}		6							
	F		15							
7	iP	0	26	0		-1.7*	-0.7*	+2.7*	270 Azimuth = 22° ± 2°, giving epicentre 53.8° N., 1.2° E. (South Dogger Bank.) Widely felt in Britain and Western Europe. Traces too faint for accurate measurement 0 ^m 26.7 ^m to 27.4 ^m . * Ranges as measured in mm.	
	iP _G		26	8		-4.7*	-1.7*	+8.0*		
	iS _{EZ}		26	30						
	iS _N		26	32						
	i		26	34						
	iS _G		26	42						
	M		27			>135*	>100*	>120*		
	F	1	5							
9	e	5	56							
	eL	6	1							
	F		20							

SEISMOLOGICAL BULLETIN.

JUNE, 1931.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	A _n	A _e			A_{z}
June, 9	e	13	0							
	F		35							
9	eP _z	14	11	53						Horizontal components disturbed by wind.
	e _{NE}		18.4							
	L _{NE}	15	5							
	L _z		12.7							
	M		16	33	19			+7		
	F	Overlapped by following shock								
9	eP _z	16	18	(31)						
	e _{NE}		41.9							
	L	17	21							
	M ₁		27	6	20		-7			
	M ₂		29	24	19			+7		
	F	18	40							
13	e _z	15	53	46						
	e _{NE}		57	16						
	e _z		57	35						
	L	16	56						+3	
	M ₁	17	5	23	19					
	M ₂		5	38	19		+2			
	M ₃		8	59	18	-3				
	F	18	5							
15	e	11	37							Disturbed by wind and microseisms.
	L	12	8							
	F		50							
17	eP _z	12	22	21					8420	
	eS _{NE}		32	2						
	e _E		33	51						
	L		54							
	M ₁		56	23	30		+8			
	M ₂		58	30	29	+9				
	M ₃	13	2	4	25					
	F		35							
17	e	17	33							
	eL _{NE}	18	2							
	eL _z		7							
	F		30							
18	iP	13	9	4						Bombay telegraphs :- iP. 13 ^h 2 ^m 7 ^s S-P. 2 ^m 43 ^s Δ. 1500 Km.
	e _z		24	38						
	L _{NE}		33							
	M ₁		34	41	21	+10				
	L _z		35							
	M ₂		39	55	15					
	M ₃		39	59	15					
	F	14	5							
	e	15	18.5							
20	eL		23							
	F		40							

SEISMOLOGICAL BULLETIN.

JUNE, 1931.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			△	REMARKS.
						An	Ae	Az		
		HR.	MIN.	SEC.	SEC.	μ	μ	μ	KM.	
June, 21	eL F	13	6 45							
22	eL F	16 17	57 40							
23	iP ₂ e _{ZN} e _{NE} L _{NE} L _Z M ₁ M ₂ M ₃ F	6	27 31.0 38.1 55 59	40						
		7	9	45	19					
			9	58	19		+10			
			10	11	18	-13				
		8	5							
25	e F	0	20 50							
27	eL F	19	7 45							
28	e F	17	16 45							
29	eP' ₂ eS _{PS} e _{CNE} eL M F	20	42.2 49.0 17 25 50							
		21	17		21	25		-4		
										(12000) Pacific Ocean off Chile. 29°S., 72°W. (U.S.C.G.S.)

J. G. Whipple
Subt.
6-7-31



SEISMOLOGICAL BULLETIN FOR July, 1951.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914)
OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T ₁ (SEC).	PENDULUM FREE PERIOD T (SEC).	DAMPING CONSTANT μ ²	Ak / π L (SEC.)
N	1930, SEPT. 9.	24.7	25.2	-0.01	47.3
E		24.8	25.2	-0.04	44.2
Z		13.0	13.5	+0.12	106.

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK (MORRISON) ;
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		An	Ae	Az		
July 2	e F	4	27 55							
5	eL F	4	40 45							
5	e e _{2N} L M ₁ M ₂ M ₃ F	7	12 20 25.6 26 26 27 ?	58 37 18 17	22	+5	+5	-6		Overlapped by next shock.
5	eZE eL M ₁ M ₂ F	7	44 49 50 51 10	54 34 24	19	+3		+4		
7	eZE eNE eL F	4	6 16 39 15	42 56						
9	ePZE e eS L M ₁ M ₂ F	12	5 5 9 11.7 12 13 45	21 43 30	13 12	+4		-2	2550	
10	e F	17	0 5							Not very distant.



DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae		Az
						μ	μ	μ	KM.
July 10	e _{ZE}	21	25.8						
	e _N		29.4						
	L		31						
	F		45						
11	eL	6	42						
	F	7	0						
12	e _Z	17	3	25					
	e _{ZE}		10	32					
	e _Z		12	10					
	e _{NE}		17	49					
	e _{NE}		20	14					
	L _{NE}		35.1						
	L _Z		38.2						
	M ₁		41	5	23	+28	-21		
	M ₂		43	58	19		+23		
	M ₃		44	17	20	-23			
	M ₄		45	5	20	-25			
	M ₅		45	37	20		-20		
	M ₆		49	11	18			+17	
	F	19	25						
12	iP _{ZE}	22	29	18					2360
	e _S		33	12					Compression.
	L _{NE}		35.5						
	L _Z		36.6						
	M ₁		36	40	13	-7		+4	
	M ₂		37	54	10				
	F		55						
15	e _{ZE}	16	38.5						
	e _{NE}		46	47					
	L _N	17	6						
	iL _E		6.5						
	M ₁		6	52	20		-4		
	M ₂		8	52	16	+4			
	iL _Z		10.2					+2	
	M ₃		14	24	13				
F	18	40							
16	e	20	26						Very small.
	F		40						
17	eP _Z	9	26	12					(9000)
	ePR _{IN}		29	49					Pacific Ocean off
	ePR _{2N}		31	43					Tehuantepec.
	e _N		37	10					14°N., 96°W. (U.S.C.G.S.)
	eSR _{IN}		41	14					
	eL		52						
	M ₁		57	42	26		+6		
	M ₂		57	49	25			+7	
F	10	35							
17	e	12	27						
	F		40						

SEISMOLOGICAL BULLETIN.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			△	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae			Az
						μ	μ	μ	KM.	
July, 17	-	-	-	-						Breaks in records, 15 ^h 50 ^m to 16 ^h 47 ^m .
18	e _z F	5 6	52 0							Very small.
18	iP _{2N} e _{NE} e _{ZN} e _{LN} e _{Lz} M ₁ M ₂ M ₃ e _{L2} F	11 12 13 14	35 44 45 54 0 10 16 18 50 0	19 46 48 56 58 52	20 20 15 25		+6	-5		Compression. Sea of Kamtschatka. 53°N., 162°E. (U.S.C.G.S.)
										Via antipodes.
19	e F	21	3 15							Very small.
20	e F	9 10	35 45							
21	iP' _z iP' _{z2} e _z ePR ₁₂ ePPS _{CCN} ePR ₂₂ eSPPS _{CCN} eSPSP _{SN} eL F	3 4 5	55 56 57 59 59 2 6 9 50 50	51 37 27 22 30 28 3 37						By path of greater deviation. Tonga Islands. 22°S., 174°W. (U.S.C.G.S.)
23	e F	3	16 25							
23	eP' _z e _z i _z i _{NE} eL F	14 15 16	39 41 42 42 20 30	31 54 18 57						Soloman Islands. 1°S., 155°E. (U.S.C.G.S.)
25	e F	13	23 35							
27	e F	7 8	52 25							
27	e _{NE} eL F	16 17	48 11 35							
29	e F	12	17 30							
29	e F	17 18	57 35							
31	e F	0 1	37 0							Very small.
31	e F	12	20 30							
31	e F	22 23	57 30							

J. W. Whipple
Supt.
5-8-31.

SEISMOLOGICAL BULLETIN FOR AUGUST, 1931.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914)
OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T ₁ (SEC).	PENDULUM FREE PERIOD T (SEC).	DAMPING CONSTANT μ ²	Ak / π L (SEC. ⁻¹)
N	1930, SEPT. 9.	24.7	25.2	-0.01	47.3
E		24.8	25.2	-0.04	44.2
Z		13.0	13.5	+0.12	106.

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK (MORRISON) ;
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae			Az
Aug. 1	e	19	35							
	eL	20	40							
	F	21	20							
5	e	8	23							
	F		35							
6	e	16	30							
	F		50							
6	e ₂	18	26	4						
	L		51							
	M ₁		56	20	15	+4				
	M ₂		58	36	15		+4			
	F	19	40							
7	eP' ₂	2	30	38					(13,500)	Probably near New Guinea.
	ePR ₁		32	7						(J.S.A.)
	iPR ₂		34	52						
	eSPS _{NE}		37	36						
	ePP _{NE}		40	27						
	iPS _{NE}		42	8						
	i ₂		46	50						(? PR ₂ by path >180°)
	i(SR) _E		49	35						
	i(PSS) _{NE}		52	8						
	i(SR) ₂ _E		52	16						
	L _{NE}		59							
	M ₁	3	15	29	27		+60			
	M ₂		17	24	24	-58				
	M ₃		17	56	24		-64			
	L ₂		19							
	M ₄		23	29	22	-84				
	M ₅		25	41	21	-84	-73			
	M ₆		25	47	20			+77		
	M ₇		28	17	19			+56		
	M ₈		32	27	18			+48		
	F	5	50							

SEISMOLOGICAL BULLETIN.

..... AUGUST, 1931.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			△	REMARKS.	
		HR.	MIN.	SEC.		SEC.	An	Ae			Az
						μ	μ	μ	KM.		
Aug. 7	e F	11	17 35								
8	e F	1 2	51 15							Very small.	
8	e _z eL F	4 5	19 3 30	49							
8	e eL F	9	19 24 45								
10	e F	11	10 40								
10/11	iP i iPP iPR ₁ iPR _{2N} i(P ₅) iE i iS L M ₁ M ₂ M ₃ M ₄ M ₅ M ₆ M ₇ F	21	28 28 28 30 31 32 35 35 36 (44) 46 50 56 58 7 9 11	21 33 51 37 59 45 19 51 19			-0.6* +4.3*	-0.8* +5.7*	+2.1* -14.8*	6400	Azimuth = 53±2°, giving epicentre near Great Altai Mountains, Mongolia. 49° N., 92° E. (J.S.A.) * Amplitudes as read in mm. Bombay telegraphs :- iP. 21 ^h 25 ^m 5 ^s iS. 21 ^h 30 ^m 19 ^s 0. 3400 km. Doubtful; traces very faint and confused by overlapping.
					13			230			
					22		>380				
					20	>240					
					(20)	>310					
		22	7	15				+290			
			9	17			>310				
			11	16		>290					
11	e F	3 4	55 10								
11	e L M ₂ F	7 8	31 35 38 0	39	11			+5			
11	e F	13	8 20								
11	e F	14	13 20							Very small.	
11	e F	18	24 35								
13/14	e _z e _z e _z e _{zN} e _{NE} e _{NE} eL M ₁ M ₂ M ₃ F	21 23	29 33 39 42 43 53.2 30 41 41 43 40	7 21 27 20 38							
			15	20				+7			
			19	20		+6	+3				
			49	20			+4				

SEISMOLOGICAL BULLETIN.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			△	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae			Az
Aug. 14	e	16	57			μ	μ	μ		
	F	17	10							
16	e	2	28							
	F		50							
16	eP _Z	11	52	4					8440	Dilatation. Texas, 30.6° N., 103.8° W. (J.S.A.)
	iPR _{1EZ}		54	53						
	eS _{NE}	12	1	46						
	iSR _{1E}		6	39						
	i _N		8	20						
	iSR _{2Z}		10	25						
	iL _{NE}		15	44						
	iL _Z		18	56						
	M ₁		25	13	15		-19			
	M ₂		25	15	15			-25		
	M ₃		25	17	16	-17				
	F	13	35							
17	eL _{NE}	18	33							
	eL _Z		40							
	F		55							
18	e	6	27							
	F		50							
18	e _Z	9	51	48					6070	Azimuth = 52° ± 2°, giving epicentre near 50° N., 92° E. (Great Altai Mountains, Mongolia.) * Amplitudes as read in mm. † Positive maximum off chart. Z trace too faint for measurement 14 ^h 55.8 ^m to 57.0 ^m .
	e		55	43						
	L _{NE}		58.2		12	-4				
	M _N		58	48						
	L _Z		58.9							
	F	10	10							
	eP	14	30	40						
	iP		30	44		-2.2*	-2.8*	+10.2		
	ePR _{1EZ}		32	38						
	iPR _{2EZ}		33	48						
	iS		38	20						
	iSS _{NE}		40	30						
	i		42	5						
	iSR ₁		42	47						
	i _{NE}		43	39						
	L _{NE}		44	12						
	L _Z		44	20						
	M ₁		50	54	22		-190			
	M ₂		51	21	19	+155				
	M ₃		54	20	20		-210			
	M ₄		56	24	15	>+180†				
	M ₅		57	23	17		-170			
	M ₆		57	28	16			+195		
	F	18	0							
18	e	18	15							
	F		55							
22/23	e	23	41							
	F	0	0							
23	eL	18	40							
	F	19	0							

Bombay telegraphs:-
iP. 14^h 27^m 26^s
iS. 14^h 32^m 33^s
Δ. 3300 Km.



SEISMOLOGICAL BULLETIN.

..... **AUGUST,** **1931.**

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			△	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae			Az
Aug. 24	e L ₂ F	3	29 34 ⁰ 40							
24/25	iP _{2E} iPR ₁₂ iS e _N eSR _{1N} eSR _{1E} i _N i _N L M ₁ M ₂ M ₃ L ₂ F	21	44 53 46 50 52 27 54 22 56 13 56 39 58 23 59 52						5970	Dilatation. Destructive in Baluchistan. Record disturbed by wind and microseisms. Indefinite. Via the Antipodes.
		22	2 8 19 8 42 13 36 7 25		21 24 16	-48	+48	+110		
25	eL F	3	43 50							
25	e F	19	28 35							
26	e M ₂ F	11	16 19 25 45	10				-3		
26	eL F	20	4 15							
26	e F	22	24 30							Very small.
27	iP ₂ iPR ₁₂ iS iSR _{1NE} iZE iE L M ₁ M ₂ M ₃ M ₄ M ₅ F	15	36 42 39 24 44 17 48 4 48 29 51 52 54						5990	Compression. Destructive in Baluchistan. Bracketed times doubtful; traces very faint. † Positive maxima off chart. Bombay telegraphs :- iP. 15 ^h 30 ^m 12 ^s iS. 15 ^h 32 ^m 50 ^s Δ. 1500 Km.
		16	0 (13) 1 20 5 (33) 7 (31) 8 22	26 22 16 15 13	+210 +230	-87 -220	+130 +230			
		19	30					-76		
28	e ₂ e _{NE} e _E eL _{NE} eL ₂ M ₁ M ₂ M ₃ F	0 1	51 51 59 32 3 52 15 19 15 49 21 1 21 11 35							
				22 16 15	-5		+3	+5		
28	e F	20	12 25							
28	e F	22	1 5							Very small.

J.J. Swan.
for Supt.
2.9.31.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR SEPTEMBER, 1931.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T ₁ (SEC).	PENDULUM FREE PERIOD T (SEC).	DAMPING CONSTANT μ ²	Ak / π L (SEC.) ⁻¹
N	1930, SEPT. 9.	24.7	25.2	-0.01	47.3
E		24.8	25.2	-0.04	44.2
Z		13.0	13.5	+0.12	106.

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT GLOCK (MORRISON); TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY. SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE.	PHASE.	G.M.T.			PERIOD. SEC.	AMPLITUDE.			Δ KM.	REMARKS.
		HR.	MIN.	SEC.		A _n μ	A _e μ	A _z μ		
Sept. 3	e F	17	47							
5	e F	1	32 40							
6	e F	7	23 30							
6	eP eS _{NE} iS _{NE} iL _{NE} L _{EZ} M ₁ M ₂ M ₃ F	8	7 10 11 11 12.3 12 14 14	1 53 0 55				2340	Compression.	
6	eL F	9	10							
6	eL F	15	4 25							
8	e F	16	50 55						Very small.	
8	e _z eL M ₁ M ₂ M ₃ F	19	21 57 0 1 4 40	39						
		20	0 52 8	5	22		+5			
			1 4	52	20	-6				
			8		19			-5		
9	eL _{NE} eL _z F	14	15 20 55							

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			KM.	REMARKS.
		HR.	MIN.	SEC.		SEC.	A _n	A _e			A_{z}
Sept. 9.	e _z	20	52	9					Dilatation. Bombay telegraphs :- iP. 20 ^h 49 ^m 14 ^s iS-iP. 8 ^m 44 ^s Δ. 7200 Km.	
	e		52	59						
	i		56	28						
	i _{ZN}		57	24						
	e _z		59	17						
	i _N	21	2	31						
	i _N		3	39						
	i _{NE}		4	55						
	i _{NE}		6	16						
	e _N		11	9						
	e _E		15	57						
	L _{NE}		25							
	M ₁		28	59	33	-21	+23			
	L _Z		35							
	M ₂		40	57	20	-13				
M ₃		41	3	19			+11			
F	23	10								
10	e _F	21	29					Not very distant.		
	F		33							
11	e _F	14	43					Indefinite.		
	F		55							
11	e _{ZN}	16	31	55				-3		
	e		34	19						
	i _N		35	7						
	L _{EZ}		37							
	M ₁		37	6	9					
	M ₂		37	15	15	+5				
F		50								
12	e _F	2	26							
	F	3	5							
12	e _z	15	53	36						
	e _{NE}	16	3	27						
	L _Z		(23)							
	F		35							
13	e _F	6	33							
	F		45							
15	e _L	22	36							
	F		55							
16	e _L	13	28					-4		
	M		35	30	24					
	F	14	0							
16	e _L	19	55							
	F	20	20							
19	e	8	39					-5		
	e _L		47							
	M ₁		47	58	21					
	M ₂		48	44	20	-6				
	M ₃		48	48	18				-7	
	F	9	5							

SEISMOLOGICAL BULLETIN.

SEPTEMBER, 1931.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			△	REMARKS.
						An	Ac	Az		
		HR.	MIN.	SEC.	SEC.	μ	μ	μ	KM.	
Sept. 19	eL F	9	35 50							
21	eP _z	2	32	38						
	eS _{CC} PS _{NE}		43	6						
	iS _{CC} PS _E		43	8						
	eL	3	3							
	M ₁		5	22	33		+28			
	M ₂		8	24	20		-24			
	M ₃		15	35	17			-18		
	M ₄		15	46	16	-30				
	F	4	30							
21	eP _z	10	40	17						
	ePR _{1,2}		43	44						
	eS _{CC} PS _E		50	47						
	ePS _z		52	1						
	L _{NE}	11	11							
	M ₁		15	48	23	+30				
	M ₂		16	56	21		+30			
	L _z		18	58				-31		
	M ₃		19	8	19			+25		
	M ₄		23	3	19					
	M ₅		23	40	18	-30				
	M ₆		23	54	15			-28		
	F	12	35							
21	e _z	13	54	25					Very small.	
	e _z		59	9						
	F	15	30							
21	eL F	22	21 45							
22	eL F	2	18 40							
22	e F	10 11	50 0						Very small.	
23	eL F	13	39 50							
25	eP _z	6	13	46				10890	Sunda Islands. 4°5'S., 101°5'E. (Strasbourg)	
	e _{ZE}		14	5						
	ePR _{1,2E}		18	4						
	ePR _{2,2Z}		20	22						
	eS _{CC} PS _{NE}		24	28					Bombay telegraphs:-	
	eS _N		25	22					iP. 6 ^h 7 ^m 9 ^s	
	iPS _{EZ}		27	13					iS-iP. 5 ^m 53 ^s	
	ePPS _{NE}		28	3					Δ 4100 Km.	
	iSR _{IN}		32	45						
	iSR _{IE}		33	3						

SEISMOLOGICAL BULLETIN.



From the ISC collection scanned by SISMO5

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			Δ	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae			Az
						μ	μ	μ	KM.	
Sept 25 (cta)	iZE	6	33	42						
	eN		36	17						
	iSR ₂ N		37	47						
	L _N		41	59						
	L _E		44	57						
	L _Z		49	55						
	M ₁		51	32	33	+115				
	M ₂		57	38	26	-130				
	M ₃		57	39	29		+89			
	M ₄	7	3	52	22	+120				
	M ₅		7	36	20		+150			
	M ₆		8	25	22	-130				
	M ₇		9	30	21			+135		† Negative maxima off chart.
	M ₈		9	36	21		+150			
M ₉		15	2	19		-80				
F	10	20								
25	e	18	9							
	F		30							
25	e	22	5							
	F	23	0							
26	e _Z	20	15	22						
	e _L		33							
	M ₁		46	30	20		+12			
	M ₂		46	34	20			+11		
	F	21	40							
28	e	18	21							
	F		35							
29	e _E	6	10							
	e _L		18							
	F		35							

No records, 28^d 9^h 2^m to 16^h 55^m.
 (British Association visit to Kew Observatory.)
 No records, 29^d 9^h 17^m to 15^h 58^m
 and 30^d 9^h 2^m to 16^h 10^m,
 during adjustments and standardisation.

F. J. Whipple.
 Supt.
 6-10-31.

K E W O B S E R V A T O R Y , R I C H M O N D , S U R R E Y , E N G L A N D .S E I S M O L O G I C A L B U L L E T I N F O R O C T O B E R , 1 9 3 1 .

Lat. 51° 28' 6" N, Long. 0° 13' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914)
OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T ₁ (SEC).	PENDULUM FREE PERIOD T (SEC).	DAMPING CONSTANT μ^2	$Ak / \pi L$ (SEC. ⁻¹)
N	1931, Oct. 8. *	24.7	25.0	+ 0.01	46.2
E	1931, Oct. 8. *	24.8	24.9	+ 0.02	44.0
Z	1931, SEPT. 30.	13.0	12.6	+ 0.02	114.

* Constants applying before this date are given in preceding bulletin.
 TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK (MORRISON) ;
 TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
 SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE.	PHASE.	G.M.T.			PERIOD. SEC.	AMPLITUDE.			Δ KM.	REMARKS.	
		HR.	MIN.	SEC.		A _n μ	A _e μ	A _z μ			
Oct. 1	eL	12	24								
	M ₁		30	9	22		+8				
	M ₂		32	33	17	-8					
	F	13	10								
3	i _Z	19	32	52						Confused by microseisms. Solomon Islands. 10°S, 161.4°E. (J.S.A.)	
	i _Z		33	44							
	i _Z		35	24							
	eNE		35	42							
	i _N		35	51							
	iNE		36	43							
	i _N		38	25							
	eE		42	29							
	iE		46	7							
	i _Z		47	59							
	i		49	13							
	i		51	37							
	iZE		53	15							
	L _N		53	59							
	L _E		54	11							
	L _Z	20	5								
	M ₁		20	0	34		-330				
M ₂		22	35	31		-340					
M ₃		23	8	28	-350						
M ₄		24	28	25		+330					
M ₅		29	46	23	-320			-260			
M ₆		30	50	22							
M ₇		32	58	24	+330						
F		?									
3	eL _{NE}	23	2							Positive maxima off chart. Overlapped by next shock.	
	eL _Z		9								
	M ₁		11	35	27		-30				
	M ₂		12	53	24	-32					
	F		?								

SEISMOLOGICAL BULLETIN.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			△	REMARKS.	
		HR.	MIN.	SEC.		SEC.	An	Ae			Az
Oct 3/4	i _Z	23	30	3							
	i		32	45							
	e _{NE}		33	11							
	e _E		41	41							
	e _{NE}		44	37							
	e _Z		49	53							
	e _L		54		27		-46				
	M ₁		57	41	24	+60					
	M ₂	0	4	30	24			-61			
	M ₃		4	35	24		+38				
	M ₄		6	52	22						
	M ₅		7	33	23	-55					
	F	1	50								
	5	i _Z	22	40	12						
		i		40	59						
e _{ZE}			42	53							
i			47	15							
L _{NE}			48								
e _Z			48	22							
e _E			48	47							
i _Z			48	51							
L _Z			52								
M ₁			52	12	19		+13				
M ₂			52	20	13			+8			
e _N			52	28							
M ₃		23	2	28	19	+12		-8			
M ₄			5	20	15						
F			35								
8	-	-	-	-							
9/10	-	-	-	-							
10	e _L	17	1					+12			
	M ₁		18	49	18						
	M ₂		23	15	17	+10					
	M ₃		23	46	13			-7			
	F	18	10								
12	e _{LNE}	4	6								
	e _{LZ}		18								
	F	5	15								
12	e _L	14	32								
	F	15	5								
13	e _L	5	41								
	F	6	40								
13	e _L	12	42								
	F		55								
14	e	7	13								
	F		25								

No records ^{h m} 9 44 to ^{h m} 17 15;
 standardisation, etc.
 No records ^{h m} 23 55 to ^{h m} 7 17;
 lights failed.

Very small.

SEISMOLOGICAL BULLETIN.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			△	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ae			Az
Oct. 18	e _z	12	58	12						
	e	1	0	58						
	e		1	44						
	eL _{NE}		43							
	eL _Z		52							
	M		54	53	23	-5				
	F	2	55							
18	i _z	4	49	33						
	i		49	59						
	e _E	5	12	38						Probably deep focus.
	e _E		13	47						No surface waves.
	e _E		15	47						
	e _E		18	45						
	F	6	30							
18	eL	7	47							
	F	8	5							
23	e _z	20	28	43						
	eL _{NE}	21	16							
	eL _Z		21							
	F	22	20							
26	eL _{NE}	5	3							
	M ₁		5	47	15	+4				
	eL _Z		7							
	M ₂		12	31	18					
	M ₃		12	59	18		+9			
	F		40							
26	eL	13	1							
	F		30							
27	eL	2	20							
	F		35							
28	eL _{NE}	6	22							
	eL _Z		31							
	M ₁		34	31	17	+9				
	M ₂		34	35	16					
	F	7	0							

F. J. W. Whipple
Supt.

5/11/31.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR... NOVEMBER, 1931.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY,

INSTRUMENTS : GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914)
OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T ₁ .	PENDULUM FREE PERIOD T.	DAMPING CONSTANT μ ² .	$\frac{Ak}{\pi l}$
N.	1931, OCT. 8.	sec. 24.7	sec. 25.0	+ 0.01	sec. ⁻¹ 46.2
E.	1931, OCT. 8.	24.8	24.9	+ 0.02	44.0
Z.	1931, SEPT. 30.	13.0	12.6	+ 0.02	114.

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK (MORRISON) ;
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDES.			Δ	REMARKS.
		h.	m.	s.		sec.	A _N	A _E			A_{Z}
Nov. 1	eL	13	34							
	F		45							
	eP _{ZN}	19	5	57						
	eS _{CCNE}		16	18						
	L _{NE}		35							
	L _Z		40							
	M ₁		42	22	21	-10				
	M ₂		49	54	16		+12			
	M ₃		49	49	15			-13		
	F	20	30							
2	eP _{ZN}	0	44	33					8850	Destructive at OAXACA, MEXICO.
	iS		54	36						15.7° N., 96.2° W. (J.S.A)
	L _N	1	7							
	L _{ZE}		11							
	M ₁		14	37	24	-12				
	M ₂		16	7	25			+30		
	M ₃		16	25	24		+27			
	F	3	15							
	iP _Z	10	15	42					9400	Compression.
	i		15	47						
2	PR ₁		19	0						Destructive in Japanese Islands of KYUSHU and SHIKOKU.
	PR ₂		21	3						
	e _Z		26	1						
	iS _{NE}		26	12						
	i _N		27	32						
	i _E		27	46						
	SR _{1NE}		31	46						
	e _c PP _{cZ}		33	15						
	i _{NE}		33	21						
	SR _{2NE}		36	6						

SEISMOLOGICAL BULLETIN.

.....NOVEMBER, 1931.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDE.			△	REMARKS.
		HR.	MIN.	SEC.		SEC.	An	Ao			Az
Nov. 2. (ctd)	L _{NE}	10	37						* Positive maxima off chart. Bombay telegraphs :- iP . 10 ^h 12 ^m 26 ^s iS-iP. 7 40 Δ 6100 Km.	
	L _Z		45							
	M ₁		50	56	23		-220			
	M ₂		52	8	22	-185				
	M ₃		54	30	24		-210			
	M ₄		58	29	19	+190*				
	M ₅		59	34	17		-210			
	M ₆		59	38	16		+240*			
	M ₇	11	1	58	17			-185		
	M ₈		4	55	20	-145				
M ₉		6	46	18		-120				
F	14	20								
2	e	15	6						Very small.	
F		10								
2	ePR _Z	17	24	19					Via the Antipodes.	
eSR _{INE}		44	27							
eSR _{2E}		46	37							
L _N		55	7							
L _E		59								
M ₁	18	9	27	25		-14				
M ₂		9	42	27	-16					
L _Z		10								
M ₃		22	52	22			-9			
eL ₂		55								
M.	19	3	5	18	+7					
F		40								
3	eL	17	0							
F		30								
4	eL	18	35							
F		55								
5	-	-	-	-					No records 9 ^h 40 ^m to 15 ^h 15 ^m .	
18	eN	4	53							
	eL		57							
	F	6	0							
20	e	14	38	45						
	e		39	32						
	eNE		49	1						
	e		50	38						
	eE		56	32						
	L _{NE}	15	13							
	L _Z		22							
	M ₁		25	44	32	+22				
	M ₂		27	56	24		+20			
	M ₃		32	13	25		-24			
	M ₄		32	33	25			-33		
	M ₅		33	19	25	+31				
	F	16	30							
24	eL	9	41						F. J. W. Shipman. Supli. 3.12.31.	
	F		55							

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR DECEMBER, 1931.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY,

INSTRUMENTS : GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914)
OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T ₁ .	PENDULUM FREE PERIOD T.	DAMPING CONSTANT μ ² .	$\frac{Ak}{\pi^2}$
N.	1931, Oct. 8.	sec. 24.7	sec. 25.0	+ 0.01	sec ⁻¹ 46.2
E.	1931, Oct. 8.	24.8	24.9	+ 0.02	44.0
Z.	1931, SEPT. 30.	13.0	12.6	+ 0.02	114.

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK (MORRISON) ;
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE.	PHASE.	G.M.T.			PERIOD.	AMPLITUDES.			Δ	REMARKS.
		h.	m.	s.		AN.	AE.	AZ.		
Dec. 1	eL	4	45							
	M		55	31	20	+10				
1	F	5	20							
	e _N	19	12							
1	L _N		28							
	L _{EZ}		39							
1	M		42	2	23	+8				
	F	20	20							
2	e	21	58							
	F	22	10							
6	e	23	37							
	F		55							
15	e	3	30							
	F		35							Not very distant.
18	eL _{NE}	10	47							
	eL _Z		53							
18	M		58	5	21	-6				
	F	11	20							
21	e	12	5							
	F		10							Very small.
25	eL	4	29							
	F	5	0							
26	e	2	29							
	F		45							Very small.
31	e	0	47							
	F	1	50							

F. W. Whipple

Supt.
4.1.32.