

# Seismological Bulletin.

No. 1.

January 1929.

## STONYHURST COLLEGE OBSERVATORY,

NEAR BLACKBURN, ENGLAND.

$\phi = 53^{\circ} 50' 40''$  N.     $\lambda = 2^{\circ} 28' 12''$  W.     $h = 116$ m.

Lithologic Foundation: Millstone Grit over Carboniferous Limestone Shales.    Time: Mean Greenwich, 0 or 24=Midnight.

### MILNE-SHAW SEISMOGRAPH.    E-W. COMPONENT.

MASS	T <sub>0</sub>	ε	V	1" TILT	Date from which Determined Constants apply.
I lb.	12.0 sec	20:1	150.	26.2 mm.	26.2 mm.

No.	Date	Phase	Time		Period	Ampl A E	Δ	REMARKS
			h. m. s.	s.				
<i>Correction to previous Bulletin, 1928 Dec. 1, N<sup>o</sup> 112. Phase S<sub>c</sub>P<sub>c</sub>S for 4<sup>h</sup> 21<sup>m</sup> 12<sup>s</sup> read 4<sup>h</sup> 31<sup>m</sup> 12<sup>s</sup>.</i>								
1.	Jan 6.	e eL M F	0 07 30 09 20 14 - 22 -					v. small.
2.	8	eL M F	8. 29 20 32 22 40 -					small.
3.	11	eL M	2 01 05 03 -					v. small.
4	13	iP ? PR <sub>3</sub> iS PS ? i ? i ? i SR <sub>1</sub> ? SR <sub>2</sub> ? SR <sub>3</sub> ? ? L M <sub>1</sub> M <sub>2</sub> F	0. 14 39 20 14 24 00 24 25 24 36 25 00 25 05 29 39 32 25 33 29 34 30 39 15 53. 25 58 - 4 20 -				7850	large large  Epic. Sea of Okhotsk. (53°N. 149°E. (stan...))
5	13	eL M <sub>1</sub> M <sub>2</sub> F	19 22 30 25 - 30 30 45 -					small "

No. 2
January (cont'd) 1929.
**STONYHURST COLLEGE OBSERVATORY,**
**NEAR BLACKBURN, ENGLAND.**

No.	Date	Phase	Time			Period s.	Ampl	$\Delta$ km.	REMARKS
			h.	m.	s.		$\mu$		
6.	Jan 14	e M F	3	04	-			v. small.	
7.	16	? i ? i ? L L M F	8.	23	25 30 10 32 03 56 - 9 01 30 40 -	25	30		
8.	17	CP? CS? ISR? L M F	11.	56	32 12. 05. 25 09 19 15 45 19 45 14 - -	25	113		
9	18	e M F	21	57	12 22 03 35 24			v. small.	
10	19	e	4	-	-			v. small.	
11.	21	e M F	10	55	- 11 09 40 12 - -			Beginning lost in change of sheet, v. small.	
12.	22	e M F	15	05	- 25 - 50 -			v. small.	
13	23	M	11.	25	-			v. small.	
14.	24	P S L M F	20	48	44 58 53 21 13 - 24 36 23 30 -	20	60	8530 Epic. Central America. 12° N. 90° W. (USCAS). Clock low <sup>er</sup> uncertain $\pm 1s$ .	
15	27	e M F	16	23	54 33 - 17 10 -				

No. 3.
February-March 1929.
**STONYHURST COLLEGE OBSERVATORY,**
**NEAR BLACKBURN, ENGLAND.**

No.	Date	Phase	Time	Period	Ampl A E	$\Delta$	REMARKS
16	Feb. 1	iP iS SR? F	17 <sup>h</sup> . 23 <sup>m</sup> . 18 <sup>s</sup> 30 13 35 35 18 30 -	s.	$\mu$	5400 km.	Epic. Turkestan. 37°5'N. 69°5' E (Strassb.) Record confused by overlapping of trace
17.	2	eP iS M? F	0. 10. 07 18 09 39 - 3. 15 -	15	35	6490	Epic. 1°S, 19°W. (Strassb.) 1°S-23°W (USCGS). surface waves very slightly developed - (Deep focus?)
18	3	e M F	3. 37 - 42.30 55 -				v. small.
19.	10	eP M F	15 21 22 16 23 34 17 16 -		small		Epic. 13°N. 98°W (USCGS) (Deep focus?)
20	15	eL M F	8. 48 - 9 02 - 15 -		v. small		Epic. 11°N. 91°W. (USCGS)
21	16	eL F	20 45 - 51 -		v. small		
22	18	i i M F	19 04 24 06 15 07 30 10 -		v. small		[Epic S. Sebastian, Spain]
23	22	iP iS L M F	20 51 09 58 46 21 04 - 11 30 23 10 -	15	142	6070	(To. 21. 41. 34) Epic. 10°N. 40°W. (Strassb.)
24	26	eP? S? L M F	9. 12. 11 21 20 35 - 41 36 11 - -	25	24	7630	Confused by Micris. Epic. Azorian Islands 56°N. 163°W. (USCGS)
25	Mar 1	eS? eL M F	7 54 46 8 06 - 10 - 40 -	20	20		Epic. 53°N. 132°W (USCGS)
26.	4	iS? L	16 56 22 17 01 -				Rest lost in overlapping of trace.



No. 4

March (cont.) 1929.

**STONYHURST COLLEGE OBSERVATORY,**

NEAR BLACKBURN, ENGLAND.

No.	Date	Phase	Time			Period s.	Ampl A E μ	Δ km.	REMARKS
			h.	m.	s.				
27	Mar. 7	iP	1.	46.	25			8200 To 1.34-53. Epic. Aleutian Islands 51°N. 170°E (USCGS).  Note: Identification of reflected Phases tentative and somewhat doubtful.	
		PR <sub>1</sub>		49	24				
		PR <sub>2</sub>		51	07				
		PR <sub>3</sub>		52	52				
		iS		56	03				
		PS		56	39				
		SR <sub>1</sub>	2	01	26				
		SR <sub>2</sub>		04	32				
		SR <sub>3</sub>		06	12				
		? L		10	-				
		M <sub>1</sub>		13	25	20	192		
		M <sub>2</sub>		16	49	16	123		
		M <sub>3</sub>		20	09	20	183		
		M <sub>4</sub>		21	59	18	219		
		M <sub>5</sub>		30	54	15	171		
W <sub>2</sub>	4	07	50	20	30				
W <sub>3</sub>	5	29	50						
F	6	-	-						
28	9	e	2.	36	-			v. small	
		eL	3	01	-				
		F		35	-				
29.	9	i	11.	16.	05			Record lost during change of sheet.	
			11.	20	to 11.26				
		i	11.	50	00				
		L	12	09	-	22	68		
		F	13	50	-				
30.	15	eL	18	15	-			v. small	
		F		25	-				
31.	19		21	- (ca.)			Epicentre 13°N. 91°W (USCGS/ISA). Illegible owing to overlapping of trace.		
32.	20	eL	22	01	-			v. small	
		M		10	-				
		F		19	-				
33.	21	eP	2	49	03			8550 Epic. 12°N. 90°W (USCGS/ISA).	
		S		58	59				
		L	3	14	00				
		M		24	20	22	18		
		F	4	10	-				

No. 5.

March - April, 1929.

## STONYHURST COLLEGE OBSERVATORY,

NEAR BLACKBURN, ENGLAND.

No.	Date	Phase	Time			Period s.	Ampl	$\Delta$ km.	REMARKS
			h.	m.	s.		$\mu$		
34.	Mar. 27	e M F	22	25	35				v. small
35.	28		21	-	(ca)				Illegible owing to overlapping of trace.
36.	31.	eL M F	21	03	-				v. small
37.	April. 7	eP? eS? L M F	19	49	09				Small.
38.	10	eP? eS? M F	5	46	54				(Epic. Bologna - Italy) v. small
39.	April 10 - 18								Record much disturbed by wind.
	19	e M F	4	21	-				v. small.
40.	20	eP? M F	1	13	07				(Epic. Monte Maggiore, Italy) Small.
41.	21	eL M F	12	53	-				v. small
42.	22	e M F	8.	32	05				v. small
43.	27	eL F	22	05	-				very small long undulations. [Epic. Italy].
44.	30	e M F	18	40	31				v. small

No. 6.

May 1929

**STONYHURST COLLEGE OBSERVATORY,**
**NEAR BLACKBURN, ENGLAND.**

No.	Date	Phase	Time			Period s.	Ampl A E μ	Δ km.	REMARKS
			h.	m.	s.				
45	May 1.	iP	15	45	37			4820	To 15. 37-21 Epic. Persia - Turkestan 43°N. 59°E (Sta.)
		PR <sub>1</sub>		47	19				
		PR <sub>2</sub> ?		47	53				
		PR <sub>3</sub> ?		48	08				
		iS		52	03				
		SR <sub>1</sub>		58	17				
		L	16	02	-				
		M <sub>1</sub>		07	10	15	188		
		M <sub>2</sub>		08	40	14	145		
		M <sub>3</sub>		10	00	16	187		
M <sub>4</sub>		11	55	17	240				
		F	19	30	-				
46.	1.	eL	22	50	-				v. Small
		F	23	05	-				
47	2	eL	15	09	-				Small
		F	16	-	-				
48	3	eL	16	48	-				v. Small
		F	17	-	-				
49.	6	e	5	28	45				
		L	6	12	-				v. Small.
		F		55	-				
50.	7	eP?	16	55	20				
		eS?	17	05	20				
		L		35	-				
		M <sub>1</sub>		40	-				Small
		M <sub>2</sub>		47	-				"
		F.	18	10	-				
51.	7	eL	18	38	-				
		M		50	-				Small.
		F	19	06	-				
52	11	eS?	19	28	37				
		M		31	40				Small
		F		45	-				
53.	13	e	13	37	-				
		e		45	-				
		L		51	-				
		M <sub>1</sub>		56	30				Small
		M <sub>2</sub>		58	-				"
		F	14	20	-				



No. 7.

 May (cont<sup>d</sup>). 1929.

**STONYHURST COLLEGE OBSERVATORY,**  
**NEAR BLACKBURN, ENGLAND.**

No.	Date	Phase	Time	Period	Ampl	Δ	REMARKS	
					$\frac{A}{E}$			
			h. m. s.	s.	$\mu$	km.		
54	May 18	e eL F	h. m. s. 17 37 - 2 04 -		$\mu$ v. small			
55	18	eP S L M <sub>1</sub> M <sub>2</sub> F	6 44 26 49 14 54 - 56 - 59 - 8 10 -	25 16	60 40	3240	Epic. Asia Minor. 40°5' N, 37° E. (Sta.)	
56	19	L F	22 30 - 23 40 -	40.			Long undulations of small ampl.	
57	20	eP? S? L M F	5 04 35 14 11 30 - 40 - 53 -			8150	Epic. Behring Sea. 54° N, 178° W. (USCG)	
58	21		Earlier Phases obscured by overlapping of trace.					
		L M <sub>1</sub> M <sub>2</sub> F	17 15 - 23 - 28 40 18 36 -	25 24	65 80.			
59	22	eL M F	21 25 - 48 - 22 10 -		$\mu$ . small			
60.	25	eP? iS? L M F	12 12 12 22 18 Absent. 30 -				Epic. N. of S. America (Strasb.) (Suspect deep focus)	
61.	26	P? S? L M F	22. 50 55 23 00 00 07 - 22 - ?	15	188.		Epic. Near Graham Island. 54° N, 134° W. ca. (I.S.I)	
			Record much obscured by overlapping of trace Readings uncertain -					
62	27	eL F	5. 55 - 6. 10 -		small.			

No. 8.

May - June 1929.

# STONYHURST COLLEGE OBSERVATORY,

## NEAR BLACKBURN, ENGLAND.

No.	Date	Phase	Time			Period s.	Ampl	$\Delta$ km.	REMARKS
			h.	m.	s.		$\mu$		
63.	May 30		Earlier Phases lost during change.						
		L	10.	31.	45 <sup>+</sup>				
		M <sub>1</sub>		43	45 <sup>+</sup>		Small		
		M <sub>2</sub>		48	30		"		
		F	12	30	-				
64	30	eL	13	10	-		v. small		
		F		35 <sup>-</sup>	-				
65	31	eL	0	53	-		v. small.		
		F	1	15 <sup>-</sup>	-				
66	June 1	L	18	48	-				
		M		58	-		0.3 small	10,900	
		F	19	07	-			Epic. Kurila Isles (Strash 40°N. 140°E (J.S.A.	
67	2	eP?	21.	49	05 <sup>+</sup>				
		PR <sub>1</sub> ?		52	20				
		iS	22	00	37	8	19		
		iSR <sub>1</sub>		06	26				
		L		18	-			(deep focus?)	
		M		27	-	20	6		
		F	23	-	-				
68	3	eP?	20	38	10			5080 Epic. Tashkent.	
		PR <sub>1</sub>		40	01			Turkestan.	
		S		44	51				
		SR <sub>1</sub>		48	11		Large		
		SR <sub>3</sub> ?		50	06				
		L?		57	-				
		M	21.	02.	10				
		F.		30	-				
69	4	e	7	24	-				
		M		36	-		0.5 small		
		F		45 <sup>-</sup>	-				
70	6	S	11.	07	44			6220 Epic. Vicinity of St. Paul's	
		SR <sub>2</sub> ?		13	51			Rock.	
		L		17	16		small.		
		M		23	30				
		F	12	10	-				
71	9		Earlier Phases lost owing to tilting. Trace off sheet. Later part of record on new sheet. Disturbance in progress.						
		?	9.	53	-				
		F	11	-	-				
72	10	eP	23	07	39			1840 Epic. 70°N. 5°E (Strash,	
		iS		10	48				
		L		14	26				
		M		15	18	13	15		
		F	24	10	-				
73	12	e	12	04	-				
		L		47	-				
		F	13	03	-		v. small		
74	13	eP	0.	24	18			8760 Epic. Kurile Isles.	
		iS		34	24			(47°N. 153°E. ca.)	
			overlapped by the following -						



No. 9.

June (cont'd) 1929

## STONYHURST COLLEGE OBSERVATORY, NEAR BLACKBURN, ENGLAND.

No.	Date	Phase	Time	Period	Ampl	$\Delta$	REMARKS		
					$\frac{A}{E}$				
75.	June 13	eP?	( <sup>h.</sup> 0. <sup>m.</sup> 37. <sup>s.</sup> 01)	s <sub>1</sub> Confused by preceding	km. 8940	10,010	Epic. 47°N, 157°E (J.S)		
		iS	47 58						
		SR?	53 35						
		M	1 16 20					20	64
76.	13	eP?	9 38 46	10.23 to 10.28 lost during change.	20	70	Epic. Near Philippines 14°N, 133°E ca (Str)		
		iS	49 44					20	75
		L	10 13 -					20	95
		M <sub>1</sub>	10 30 -						
		M <sub>2</sub>	32 -						
		M <sub>3</sub>	33 30						
		F	12. 20 -						
77	13	eL	20 45 -	v. small					
		F	21 13 -						
78.	13	i?	23 26 40	Small					
		eL	58 20						
		M	59 30						
		F	0. 55 -						
79.	16	P'	23 07 31	20	160	18,700	Epic. New Zealand Murchison district. 42°S, 172°E. ca.		
		PR <sub>1</sub>	12 31						
		PR <sub>2</sub>	16 34						
		PR <sub>3</sub>	19 28						
		?	35 35						
		M	0 24 33						
		(F)	2 35 -						
W <sub>3</sub> ?	3 34 -								
80.	17	eL	11 14 -	v. small					
		M	16 -						
		F	45 -						
81.	19	e	7 55 35	a long undulation.					
		i	56 47						
		?	8 17 52						
		L	28 35						
		M	33 15					Small	
		F	9 25 -						
82	22	In	16 - -	Small disturbance					
		F	18 - -					Confused by wind tremors.	

No. 10

 June (cont<sup>d</sup>) 1929.

 STONYHURST COLLEGE OBSERVATORY,  
 NEAR BLACKBURN, ENGLAND.

No.	Date	Phase	Time			Period s.	Ampl	$\Delta$ km.	REMARKS
			h.	m.	s.		$\mu$		
83	June 27	eP	13	01	39			12,600	Epic. Atlantic Ocean N. of Sandwich Is. (Strasb).  Note. Identification of Phases = difficult or tentative.
		PR <sub>1</sub>		06	34				
		PR <sub>4</sub>		12	26				
		PS		16	10				
		SR <sub>1</sub>		21	34				
		PSSS?		26	06				
		?		32	46				
		L		41	10				
		M <sub>1</sub>		44	11	20	140		
		M <sub>2</sub>		50	46	20	175		
		M <sub>3</sub>		53	26	20	120		
		M <sub>4</sub>		55	21	20	90		
		M <sub>5</sub>		59	12	15	87		
		M <sub>6</sub>	14	02	50	17	117		
		M <sub>7</sub>		05	41	15	77		
F	18	-	-						
84	27	e	22	46	14			v. small	
		M		48	40				
		F	23	10	-				
85	30	e	3	03	08				
		i		10	50				
		M		43	00	25	15		
		F	5	30	-				

J. P. Howland S. J.  
 Observer.

Monyhurst College Observatory  
Near Blackburn. England.

1931 July.

We acknowledge, with thanks the receipt of the following seismological bulletins, to the dates indicated:-

Station.	Bulletins, to:-
Apia	1931 March
Barcelona	1930 May
Berkeley	1930 March
Budapest	1928 December
Cartuja	1931 February
Chinfeng	1931 February
Copenhagen	1928 September
Cincinnati	1928 December
Denver	1930 March
Florence	1930 December
Fordham	1931 January
Georgetown	1931 April
Granada	1930 December
Hamburg	1931 March
Hong Kong	1931 January
J. S. A.	1931 April
Kew	1931 May
Koti.	1930 January
Kucino	1927 December
La Paz	1931 February
Leningrad	1930 March
Manila	1931 February
Melbourne	1931 March
Mexico	1928 December
Osaka	1930 September
Ottawa	1931 April
Paris	1931 April
Pasadena	1931 April
Pulkovo	1927 December
Reykjavik	1930 October
Rio de Janeiro	1929 December
Riverview	1931 March
Rome:	
R. Ufficio Centrale	1926 January
Samoa	1928 September
San Fernando	1931 March
Spain:	
Servicio Sismolog.	1930 August.

Station.	Bulletins, to:-
Straasbourg:-	
Bureau Cent. Franc.	1930 December
Universite	1930 April
Union Geodes.	1930 April.
Suere	1928 December
Sverdlovsk	1927 December
Tashkent	1927 "
Tanamarive	1930 "
Toronto	1931 April
Uccle	1931 March
U.S. Coast & Geodetic Survey	1927 December
Zagreb	1930 "
Zi-Ka-Wei	1931 February
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Coimbra	1930 December
De Bilt	1928 "
Gottingen	1930 "
Jena	1930 "
Moncalieri	1928 "
Pompeii	1928 "
Tiflis	1927 "
Victoria B.C.	1929 June.

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