

SEISMOGRAPH RECORDS

For the Months of January & February, 1938

FROM HELWAN OBSERVATORY, EGYPT

= 29° 51' N, = 31° 20' E, h = 115m.

Director ..... Dr. M.R. Madwar

Seismograph Milne-Shaw recording E-W motion

Theoretical magnification = 250

Period of undamped pendulum = 12.0

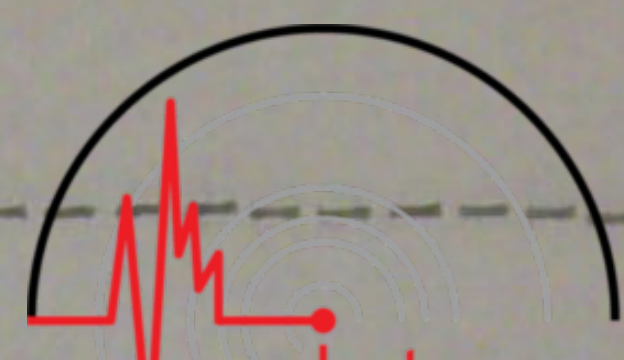
Times are expressed in Greenwich Civil Mean Time



Date 1938	Phase	Time			Period	Amplitude A <sub>E</sub>	Remarks
		h.	m.	s.			
Jan. 1	e e F	11	45	08			
			54	27			
		13.5					
1-2	eP e e S e (PPS) F	23	40	(33)			
			41	27			
			51	15			
				45			
			52	16			
			53	16			
		2.5					
2	i i i F	10	57	39			
			58	42			
		11	04	06			
		11.6					
2-3	e e e i F	22	46	48			Preceded by microseisms
			49	12			
			54	14			
		23	02	42			
		1.0					
3	eP e e e M F	17	25	18			" " "
			27	53			
			28	18			
			29	24			
			34				
		17.7					
7	e e e F	15	46	42			" " "
			52	30			
			55	48			
		18.2					
10	e e F	21	06	48			" " "
			17	11			
		22.2					
11	iP i i e iS i M F	15	24	30			" " "
				45			
			25	47			
			27	25			
			34	47			
			35	13			
		16	06	36	20		
		17.0				±9	



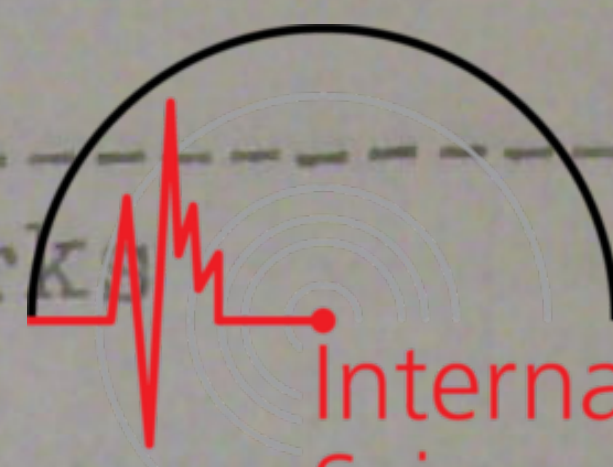
Date 1938	Phase	Time	Period	Amplitude	Remarks
		h. m. s.	s.	AE	
Jan. 13	e e F	14 38 00 39 45 15.0			Preceded by microseisms
16	Pn P Sn Sg F	13 38 47 39 16 58 40 34 13.9			Local (not felt)
18	(eP) iS e SS F	4 31 36 41 20 45 46 (30) 5.8			Preceded by microseisms
18	iP i i F	9 35 22 40 30 45 26 10.6			" " "
22	e e e F	15 39 18 49 24 50 08 16.3			
23	eP' SKP e e PPS M F	8 52 15 55 20 50 9 02 24 05 15 10 35 06 11.7	18	+ 10 -	Via antipode
24	eP PP SKS S PS (L) M F	10 45 (25) 50 10 57 12 58 03 11 00 00 17 00 37 28 14.6	16	± 34	Preceded by microseisms  B Meas 105.1
25	e e F	16 43 00 58 26			" " " Confused with the succeeding earthquake
26	eP PPP i i i S M F	3 43 16 49 45 48 46 24 48 47 12 51 36 5.4	9	± 44	" " " Felt in Irak
29	P (S) e F	4 21 54 28 48 29 10 5.4			



International  
Seismological  
Centre

Tremors were also recorded at :





Date	Phase	Time	Period	Amplitude	Remarks
1938				A E	
		h. m. s.; s.	D H	D H	D H
		3 17, 20, 22	6 21	12 1, 3, 13,	13 5
		14 0, 23, 14	22 3	25 0	27 17
Feb. 1-2	P	19 18 12			Preceded by microseisms
	PPP	24 (35)			
	SKS	28 (50)			
	(S)	29 48			
	SS	36 (50)			
	M	20 09 (00)	18	±632	
	F	0.0			
4	M	0 39 33	14	±10	
	F	1.0			
5	P	2 37 25			Deep focus
	PP	38 02			h = 150 Km.
	PP	41 30			Δ = 102°
	PPP	44 10			
	PPPP	30			
	SKP	47 45			
	SKKS	48 20			
	iS	53			
	ss	50 00			
	M	3 26 45	17	±17	
	F	5.1			
5	iP	10 07 35			h = 160 Km.
	PP	08 18			Δ = 84°
	PP	11 05			
	S	17 50			
	ss	18 50			
	e	19 40			
	F	11.2			
8	i	7 41 23			Preceded by microseisms
	e	45 00			
	M	8 25 35	14	±5	
	F	9.5			
8	e	13 35 00			" " "
	e	38 00			
	F	14.0			
8	e	14 46 43			" " "
	M	15 37 54	18	±10	
	F	17.4			
10	P <sub>n</sub>	20 39 32			Local (not felt)
	P	48			
	P <sub>g</sub>	40 04			
	S <sub>n</sub>	42			
	F	21.4			
13	eP	8 24 (00)			" " "
	i	27 32			
	F	10.8			
14	iP	2 58 55			
	iS	3 02 47			
	SS	03 36			
	F	4.0			



Date 1938	Phase	Time			Period s.	Amplitude AE	Remarks
		h.	m.	s.			
Feb. 15	P	3	37	03	12	± 11	
	e		44	36			
	e		49	00			
	L		56	42			
	M	4	08	30			
	F	5.6					
15	iP	7	06	31	15	± 7	
	e		09	34			
	e		14	32			
	M		32	24			
	F	8.7					
17	e	1	03	36			
	e		04	38			
	F	1.2					
19	e	7	46	12			
	F	8.4					
22	e	5	39	00	18	± 10	Local ( not felt )
	M		54	18			
	F	6.4					
28	e	12	34	30			
	e		36	12			
	F	12.7					



For the Month of March 1938

FROM HELWAN OBSERVATORY, EGYPT

$\phi = 29^{\circ} 51' N$ ,  $\lambda = 31^{\circ} 20' E$ ,  $h = 115 m.$

Director ..... Dr.M. R. Madwar

Seismograph Milne-Shaw recording E - W motion  
 Theoretical magnification = 250  
 Period of undamped pendulum = 12s.0  
 Times are expressed in Greenwich Civil Mean Time



Date : 1938 ;	Phase :	Time :	Period :	Amplitude :	Remarks
		h. m. s.	s.	mm	
1-2	(eP) e eS M F	23 39 42 42 34 50 18 00 15 23 1.2	15	1 9	Preceded by microseisms
8	eP i F	5 55 35 6 02 52 8.7			
10	eP e (PP) S e F	16 33 54 34 15 37 24 44 29 46 31 17.6			
11	Fn e Sn S <sup>x</sup> F	14 54 05 20 56 15 57 06 15.4			
11	eP e S M F	16 56 25 57 40 17 00 38 05 48 17.8	8	1 9	
12	eP S M F	12 42 (36) 46 52 52 00			Confused with the succeeding earthquake
12	eP S M F	13 09 45 13 43 18 46 14.0	10	1 6	
12	P S M F	20 09 15 13 15 18 22 21.0	7	1 7	
13	i M F	17 50 46 59 10 18.8	15	1 12	
13	e M	21 17 24 27 00	14	1 13	



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 Date : Phase : Time : Period: Amplitude : Remarks  
 1938 : : : : : AE :  
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		Time			Period	Amplitude	Remarks
		h.	m.	s.			
14	P	00	56	10			
	PPP		58	00			
	S	1	02	15			
	(SSS)		05	24			
	M		17	15	15		
	F	2.0				10	
14	P	5	24	30			
	PP		26	50			
	S		32	49			
	e		33	09			
	PS			18			
	F	6.5					
22	eP	15	35	(54)			
	e		40	20			
	i		46	33			
	i		47	18			
	i		48	42			
	F	18.4					
25	e	16	09	25			
	e		15	09			
	e		19	41			
	F	18.4					
27	iP	11	20	56			
	e		21	20			
	e			25			
	e		24	26			
	F	12.0					
31	iP	22	43	22			
	e			35			
	e		44	10			
	iS		53	26			
	i		54	00			
	F	24.0					

Tremors were also recorded at :

D H D H D H D H  
 5 1,12 6 10 8 4 9 4

10 16 13 1,2 13 8,14 16 1,6

17 13



SEISMOGRAPH RECORDS.

For the Month of April, 1938

From HELWAN OBSERVATORY, EGYPT

$\phi = 29^{\circ} 51' N$   $\lambda = 31^{\circ} 20' E$   $h = 115 m.$

Director, Dr. M. R. Madwar



Seismograph Milne-Shaw recording E-W motion  
 Theoretical magnification = 250  
 Period of undamped pendulum = 12s.0  
 Times are expressed in Greenwich Civil Mean Time.

Date: 1938:	Phase:	Time	Period	Amplitude:	Remarks.
		h. m. s.	s.	$\Delta$	
1	eP i F	21 43 (30) 53 38 23.2			Preceded by microseisms
2	e e M F	6 26 54 27 54 7 03 42			Other phases lost in changing the paper 18 + 11 Confused with the succeeding earthquake
2	i F	7 53 39 8.8	"	" "	preceding "
13	iP i iS F	2 49 20 50 30 52 12 6.3			Near earthquake
14	P pP i pPP PPP S SS i F	1 26 05 35 27 32 28 40 29 40 33 45 34 48 35 45 2.8			$h = 150 km.$ $\Delta = 57^{\circ}$
19	P i i iS F	11 01 36 44 02 12 03 32 13.5			Destructive earthquake in Anatoli
19	e i i F	23 13 40 15 22 16 30 24.0			Preceded by microseisms
20	P e e e F	6 46 52 47 20 50 27 51 40 9.2			
21	eP e e M F	1 37 54 41 58 50 36 2 04 30 3.2	14	6	



SEISMOGRAPH RECORDS



For the Month of ..... May ..... 1938

FROM HELWAN OBSERVATORY, EGYPT

$\phi = 29^{\circ} 51' N$        $\lambda = 21^{\circ} 20' E$        $h = 115 m.$

Director..      Dr. M. R. Madwar

Seismograph Milne-Shaw recording E-W motion

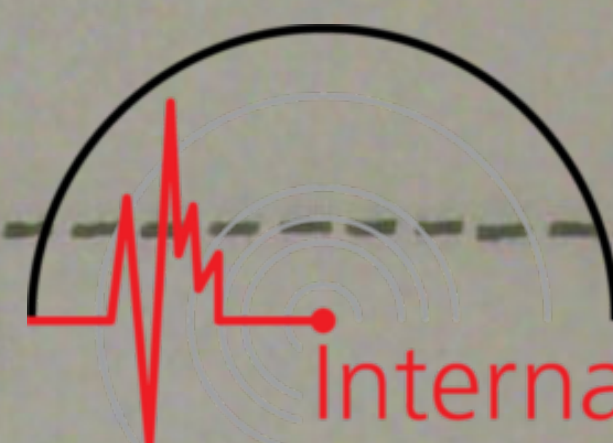
Theoretical magnification = 250

Period of undamped pendulum = 12.0s.

Times are expressed in Greenwich Civil Mean Time

Date 1938	Phase	Time			Period	Amplitude	Remarks
		h.	m.	s.			
5	P S F	11	56	15 31		~	Local (felt at Helwan) $\Delta = 1^{\circ}.2$
				12.0			
6	e e F	18	45 46	30 27			Preceded by microseisms
				20.1			
8	e e e M F	14	05 10 15 52	54 06 06 42	15	9	" " "
11	eP i i i F	15	04 05 11 14	30 27 18 28			
				17.0			
11	i F	15	06 09	45			Local ( not felt ) confused with the preceding earthquake
12		15					) Very good records unfor- ) tunately clock relay was ) not working.
12		21	(felt at Khartoum)				
12		22					
13	i F	15	31	00			
				16.3			
14	e F	4	50	03			
				5.2			
14	i F	12	21	43			
				13.3			
16	i F	15	55	14			
				16.3			
19	eP i i SKS S SS M F	17	21	24 42 25 30 31 42 32 10 38 14 03 05	24	674	
				21.3			





Date:	Phase :	Time			Period:	Amplitude:	Remarks
1938:	:	h.	m.	s.	s.	$\mu$	
23	1P	7	31	16			
	PP		34	35			
	SKS		41	36			
	iS			56			
	PPS		43	15			
	SS	7	47	46			
	M	8	13	58	18	+ 86	
	F				Confused with the following earthquake		
23	P	8	34	06	"	"	Preceding "
	PP		37	02			
	e		38	00			
	PPP			57			
	e		41	36			
	iS		44	03			
	SS		49	21			
	M	9	12	39	18	+ 29	
	F	11.6					
28	eP	16	54	35			
	e		58	15			
	(eS)	17	05	02			
	F	18.5					
30	P'	14	49	10			
	PP		52	18			
	SKP			48			
	SKKS		59	12			
	PSKS	15	02	24			
	e		03	18			
	M		51	18	24	+ 32	
	F	18.1					
31	e	18	00	04			
	e		01	24			
	F	18.7					
31	e	19	39	18			
	e		40	45			
	F	20.4					

Tremors were also recorded at :-

D	H	D	H	D	H	D	H
1	2	2	15	6	4	8	13
14	7	22	8, 9, 10	27	22	28	00



SEISMOGRAPH RECORDS

For the Month of June, 1938

FROM HELWAN OBSERVATORY, EGYPT

$\phi = 29^{\circ} 51' N$   $\lambda = 31^{\circ} 20' E$   $h = 115$  m.

Director... Dr. M. R. Madwar



Seismograph Milne-Shaw recording E - W motion

Theoretical magnification = 250

Period of undamped pendulum = 12s.0

Times are expressed in Greenwich Civil Mean Time

Date 1938	Phase	Time h. m. s.	Period s.	Amplitude AE	Remarks
3	iP <sup>x</sup> Pg S <sup>*</sup> F	16 39 25 38 40 30 17.0			Local (not felt) $\Delta = 5^{\circ} 0'$
9	iP PP PPP i SKS iS PS PPS L M F	19 28 36 32 33 34 45 36 24 39 06 40 03 41 16 42 00 20 01 50 18 51 23.0	16	+ 42	
10	P i PPP iS PS L M F	10 05 51 06 03 10 54 16 09 54 33 00 45 45 14.2	16	+ 114	
14	P <sub>n</sub> S <sub>n</sub> S <sup>*</sup> S <sub>g</sub> F <sub>g</sub>	10 53 48 55 02 23 45 11.0			Preceded by microseisms $\Delta = 6^{\circ} 4'$
16	P i F	2 01 25 05 00			Confused with the succeeding earthquake
16	iP iS (PS) L M	2 27 42 38 12 56 3 01 00 10 51	15	+ 50	
20	eP <sub>gg</sub> eS <sub>gg</sub> F	5 35 40 36 00 37 00			Local (not felt)



Date : Phase : Time : Period : Amplitude : Remarks  
 1938 : : : : : A<sub>E</sub> :



Date	Phase	Time			Period	Amplitude	Remarks
		h.	m.	s.			
20/21	iP	23	57	50			
	PP		59	08			
	PPP			34			
	iS	00	03	52			
	F	2.5					
23	iP	13	14	45			Far earthquake
	e		17	42			
	e		18	12			
	M	14	14	25	19	11	
	F	16.0					
24	e	19	49	39			
	i		50	51			
	e		54	12			
	F	20.2					
25/26	iP	23	53	52.5			
	PPP		56	24			
	iS	00	00	54			
	F	0.5					
27	iP	9	42	57			
	F	11.1					
28	iP	19	37	05			
	i			25			
	i		46	44			
	F	20.3					
29	e	9	53	12			
	i	10	03	42			
	F	10.3					
29	eP'	19	04	03			Far earthquake
	e		08	00			
	e		15	00			
	e		20	05			
	F	21.2					
30	iP	17	04	06			
	i		07	12			
	e			51			
	F	19.0					

Tremors were also recorded at :

D	H	D	H	D	H	D	H
13	4	15	8, 13	23	2	27	7
28	1	29	7				



SEISMOGRAPH RECORDS.  
FOR THE MONTH OF JULY, 1938.  
FROM HELWAN OBSERVATORY, EGYPT

$\phi = 29^{\circ} 51' N.$      $\lambda = 31^{\circ} 20' E.$      $h = 115 m.$

Director : Dr. M.R. Madwar.

Seismograph Milne-Shaw recording E-W motion  
Theoretical magnification = 250  
Period of undamped pendulum = 12.0 s.  
Times are expressed in Greenwich Civil Mean Time

Date 1938	Phase	Time			Period s.	Amplitude A <sub>E</sub>	Remarks
		h.	m.	s.			
4	i F	12	57	51			Preceded by microseisms
			13.1				
4	P <sup>i</sup> e e F	21	32	00			" " "
			35	17			
			36	06			
			23.6				
5	eP <sup>i</sup> e PP (SKP) i <sub>b</sub> i F	2	23	22			" " "
			24	03			
			26	24			
			57				
			27	00			
			30	58			Confused with the succeeding earthquake
			32	38			
5	i F	3	14	06			
			5.7				
5/6	eP <sup>i</sup> e e e F	22	26	42			" " "
			29	54			
			31	28			
			35	48			
			1.3				
6	eP <sup>i</sup> e e e F	1	43	56			" " "
			45	00			
			47	27			
			51	32			
			5.1				
6	iP e F	9	59	06			
			10	08			
			12.0				
12	eP e F	12	56	17			
			15.0				
14/15	eP i i F	23	51	05			
				43			
			52	36			
			0.1				
19	eP (S) F	19	50	41			
			55	10			
			20.2				





Date 1938	Phase	Time			Period s.	Amplitude A <sub>E</sub>	Remarks
		h.	m.	s.			
19	e	21	40	35			
	e		47	06			
	F	22.8					
20	iP	00	26	06			
	PPP			12			
	i		27	00			
	i			30			
	iS		28	03			
	F	1.2					
20	eP	12	12	41			
	e		14	45			
	e		22	18			
	F	13.2					
21	eP	9	17	25			
	i		22	50			
	F						
Confused with the succeeding earthquake							
21	i	9	28	17			
	i		29	02			
	i			38			
	F	11.0					
21	eP	21	58	24			
	i	22	01	36			
	F	22.5					
22	e	8	08	12			
	F	10.8					
24	i	13	25	41			
	i		36	30			
	F	15.0					
29	e	11	30	24			
	e		37	00			
	F	12.0					
29	iP	13	17	53	16	± 32	
	iS		27	06			
	M		49	30			
	F	16.0					

Tremors were also recorded at :

D	H	D	H	D	H	D	H
2	13	19	20	13	20	17	12
23	23	25	22	27	1,17	30	20



SEISMOGRAPH RECORDS  
FOR THE MONTH OF AUGUST, 1938  
FROM HELWAN OBSERVATORY, EGYPT



$\phi = 29^{\circ} 51' N. \lambda = 31^{\circ} 20' E. h = 115 m.$

Director... Dr. M. R. Madwar

Seismograph Milne-Shaw recording E-W motion  
 Theoretical magnification = 250  
 Period of undamped pendulum = 12.0 s.  
 Times are expressed in Greenwich Civil Mean Time

Date 1938	Phase	Time			Period	Amplitude	Remarks
		h.	m.	s.			
4	e	9	07	40	11.4	158	
	i		13	20			
	e		14	09			
	i		19	21			
	e		20	10			
	F		22	31			
12	iP	4	25	42	4.5		
	i		26	21			
	F						
15	e	11	05	21	11.3		
	e		08	10			
	e			30			
	i			39			
	F						
16	iP	4	37	30	8.5	158	h = 150 Km Δ = 56°
	pP		38	02			
	PP		39	44			
	PPP		40	56			
	S		45	03			
	i			36			
	SS		46	03			
	M		5 07	36			
F							
17	P	1	58	03	2.3		
	i		2 08	20			
	F						
18	iP	9	41	44	10.3	158	h = 100 Km Δ = 75°.5
	PP		42	06			
	e			14			
	PP		44	40			
	e		45	00			
	e		47	35			
	e		48	00			
	e		50	20			
	iS		51	15			
	SS			54			
F							
18	iP	19	18	51	20.4		
	i		19	03			
	e		29	03			
	F						





Date : Phase : Time : Period: Amplitude: Remarks  
 1938 : : : : :  $A_E$  :

		Time			Period	Amplitude	Remarks
		h.	m.	s.			
20	P F	8 9	14 00	54 35			Very weak Confused with the succeeding earthquake
20	eP e F	8 9	50 00	54 35			
			10.5				
22	iP PP eS e e F	21	47 49 54 55	02 08 48 06 30			
			22.7				
23	eP e F	8	25 32	15 42			
			9.3				
24	e i F	16	07 08	30 22			
			17.0				
25	iP e e i PP e S PS e e M F	1	39 40 42 43 49 50 51 14	48 00 27 15 42 00 28 10 48 03 55	15	+ 16 -	
			4.4				
26	(eP) e i F	7	45 50	08 27 34			
			8.6				
28	(eP) e i F	5	23 26	30 39 57			
			5.8				
29	iP e e e PP iS i i M F	15	35 37 38 45 46	08 15 33 21 27 36 10 50 55	18	+ 14 -	
			18.5				
30	PP e SKP i i S i PS	12	07 08 09 15 16 17 18	57 51 06 24 02 00 25 22			
			15.8				



Date 1938	Phase	Time			Period s.	Amplitude A <sub>E</sub>	Remarks
		h.	m.	s.			
30	e	17	22	20			
	e		33	00			
	F	18.5					
31	e	18	04	45			
	e		06	09			
	e			36			
	e	18	09	45			
	F	19.2					

Tremors were also recorded at :-

D	H	D	H	D	H	D	H
10	11	11	10	14	21	15	11
		22	11	31	16		



SEISMOGRAPH RECORDS

For the Month of September, 1938  
FROM HELWAN OBSERVATORY, EGYPT

$\odot = 29^{\circ} 51' N. \quad \lambda = 31^{\circ} 20' E. \quad h = 115 m.$

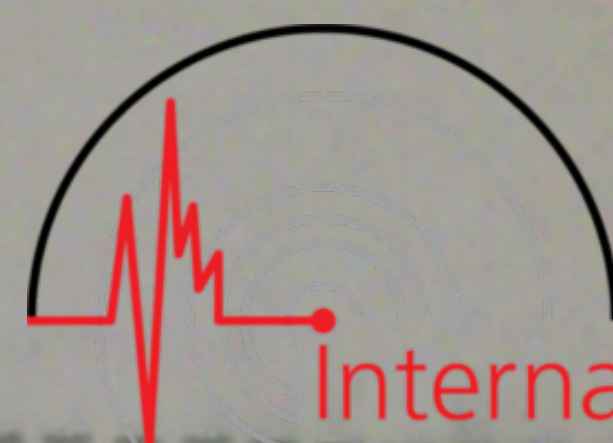
Director : Dr. M. R. Madwar

Seismograph Milne-Shaw recording E-W motion  
Theoretical magnification = 250  
Period of undamped pendulum = 12.0s  
Times are expressed in Greenwich Civil Mean Time

Date : 1938 :	Phase :	Time :	Period :	Amplitude :	Remarks :
		h. m. s.	s.	A <sub>E</sub>	
1	iP e e F	3 06 20 16 18 17 07			
		14.0			
1/2	i F	23 13 36			
		1.0			
4	eP e e F	19 34 (04) 37 18 44 18			
		20.6			
4	i P F	22 28 03 23.4			
5	iP i F	15 02 55 (18)			
		17.1			
6	i e F	13 32 34 36 06			
		14.0			
6	iP i F	20 58 35 21 09 30			
		22.1			
7	iP i (iS) F	2 07 42 08 03 18 10			
		3.2			
7	iP e PP PPP i iS e M F	4 15 21 40 18 15 20 00 16 25 15 26 12 55 09 18			
		Lost in changing the paper			
7	i F	13 18 35			
		15.0			

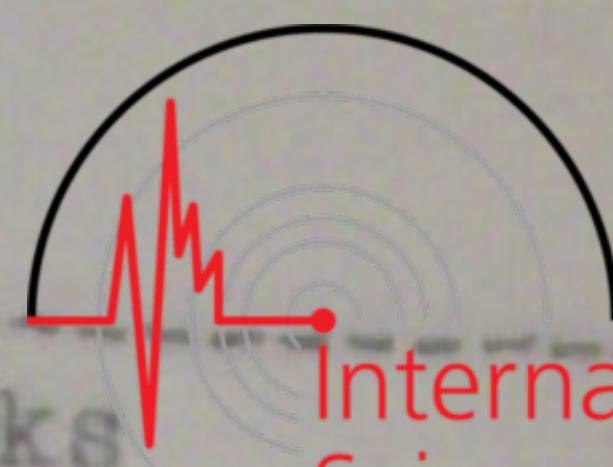






Date 1938	Phase	Time			Period s.	Amplitude A <sub>E</sub>	Remarks
		h.	m.	s.			
10	(eP) S F	22	32 39	36 40			
			23.6				
11 17	i e F	17	32 17	47 33			
			5.7				
18	iP PP e e (S) i i F	00	43 44 45 47 50 51	30 58 25 26 40 03 12			
			1.6				
18	e e F	1	52 57	30 45			
			Confused with the succeeding earthquake				
18	eP e i i F	2	22 25 26	02 24 11 03			
			2.7				
18	iP i e e iS F	3	53 54 55	15 35 00 22 10			
			4.9				
18	e i F	5	19 20	55 03			
			5.6				
18	iP i iS i F	20	26 30 32	39 42 45 51			
			21.1				
19	i i F	0	49 50	40 00			
			1.0				
21	iP i e PP eS F	19	04 06 08 15	41 57 06 06 27			
			22.0				
27	iP PP i e iS M	2	36 37 38 39 40 43	35 02 26 05 42 (15)			
					(10)		+ (297)





Date : 1938 :	Phase :	Time			Period :	Amplitude :	Remarks
		h.	m.	s.	s.	A <sub>E</sub>	
27	e F	10	36	05			Confused with succeeding earthquake
27	e F	11 12.7	34	12			
27	eP e i i F	14	01	36 49 02 03			
27	e e e F	15	30 34 36	00 03 12			
28	i e F	18	35 36	17 18			
28	iP <sub>n</sub> i S F	21	56	35 41 18			Felt at Choubrah (district of Cairo)
		22.1					

Tremors were also recorded at :-

D	H	D	H	D	H	D	H
7	7	9	17	12	19	18	12.22
20	14	25	21	27	10	29	3



SEISMOGRAPH RECORDS

For the Month of October, 1938  
FROM HELWAN OBSERVATORY, EGYPT



$\phi = 29^{\circ} 51' N$ ,  $\lambda = 31^{\circ} 20' E$ ,  $h = 115 m.$

Director : Dr. M. R. Madwar

Seismograph Milne-Shaw recording E-W motion  
Theoretical magnification = 250  
Period of undamped pendulum = 12s.0

Time are expressed in Greenwich Civil Mean Time.

Date: 1938:	Phase :	Time			:Period: :	:Amplitude: :	Remarks.
		h.	m.	s.			
1	e M F	5	18 28	08 32	9	$\pm 7$	
1	e e F	8	23 25	40 29			
2	eP e e M F	16	47 51 56	54 33 06	15	$\pm 12$	
4	e	20	16	39			
7	i	1	04	57			
7	eP (S) F	6	21 30	53 21			
7	iP PP e e S M F	16	34 36 38 42	00 21 42 20	20	$\pm 17$	Dilatation
9	e i i F	2	51 52	17 27 11 54			
9	P i e e F	16	56 58 59	10 24 36 42			Dilatation
9	F	20	49	33			
10	iP i PP i PPP	21	01 02 05	22 05 20 34 12			



Cont.	Phase	n.	Time	Time	Period	Amplitude	Remarks
10	SKS FS M F		11 14 42	54 10 12	S 24	+ 115	
		24.0					
11	P e F	00	21 31	15 43			
		1.4					
11	e e F	16	12 14	39 12			
		17.0					
11	eP F	19	29	30			
		19.7					
12	iP i i iP PPP S M F	00	47 48 50 52 57 35	11 22 16 31 27 38 28			Dilatation
		01 4.0			15	+ 14	
12	e F	6	19	36			
		6.6					
12	e e i i F	17	21 25 27 28	17 24 30 24			
		17.9					
13	eP F	2	37	31			
		2.8					
13	iP e F	15	38 48	21 15			
		17.0					
14	e F	3	54	24			
		4.3					
15	e e F	19	25 26	15 00			
		19.6					
17	iP e (S) i F	15	38 39 48 50	51 53 45 28			
		16.1					
17	iP e e F	22	51 52	11 21 15			
		23.2					
19	eP i e PP i S SS M F	4	22 23 28 29 32 49	05 12 02 58 56 16 45 35			
					12	+ 19	



lost in changing the paper.



Date: Phase : Time : Period: Amplitude: Remarks  
 1938: : : : : :  
A  
E



		h.	m.	s.	s.		
20	ip	2	32	47			
	e		33	15			
	e		34	15			
	e		35	39			
	e		37	10			
	S		43	15			
	PS		44	06			
	M		15	10	16	+ 28	
	F	Confused with the succeeding earthquake					
20	e	4	18	40			
	e		24	27			
	F	5.9					
20	e <sup>P</sup>	8	21	05			
	(S)		25	10			
	e		27	25			
	F	Confused with the succeeding earthquake					
20	e	8	39	50			
	F				"	"	"
20	e	8	52	15			
	F				"	"	"
20	e	9	06	21			
	F	9.3					
20	i <sup>P</sup>	13	19	48			
	e		20	59			
	S		23	50			
	M		26	20	12	+ 56	
	F	15.0					
20	e	15	31	22			
	e			42			
	F	16.0					
20	e	17	30	23			
	e		36	33			
	F	18.0					
20	e	22	53	42			
	e		55	18			
	F	23.0					
21	i	6	57	15			
	i	7	00	21			
	i		06	18			
	F	7.3					
21	i <sup>P</sup>	20	32	17			
	e		33	12			
	PP		34	16			
	e			40			
	S		38	46			
	i		42	20			
	F	22.0					
21/22	i <sup>P</sup>	23	55	32			
	e	00	06	12			
	e		07	00			
	F	2.0					
22	e	9	28	18			
	F	Confused with the succeeding earthquake.					



Date: Phase : Time : Period: Amplitude:  
 1938: : : : : AE :

Remarks



International  
Seismological  
Centre

		h.	m.	s.	s.		
22	e e F.	9	45	42 48			
		10.0					
23	eP iS e SS M F	2	30 33 34 40	08 39 54 14 06	(9)	+ 171	
		4.2					
23	e e e F	4	10 16	18 30 42			
		4.9					
23	iP i F	5	19	22 36			
		6.3					
23	iP S (SS) M F	15	10 17 20 30	00 08 06 03	12	+ 27	
		17.3					
24	e e F	13	21	24 54			
							Confused with the succeeding earthquake
24	e e F	13	33	24 39			
		14.0					
24	e e e F	19	13 19	12 15 30			
		19.6					
26	P eS M F	3	11 15 17	23 30 50	10	+ 18	
		4.0					
29	iP PP e e (S) F	13	21 24 31	12 30 45 30 40			Dilatation
		14.5					
29	P i pP SKS S sS F	23	05 06 16 17	49 12 36 07 27 08			$\delta = 89^\circ$ $h = 80 \text{ km}$
		24.0					

Tremors were also recorded at:-

D	H	D	H	D	H	D	H	D	H
4	2, 21	5	00	7	10, 11	9	14	10	4
12	20	19	10	21	20				



SEISMOGRAPH RECORDS

For the Month of November 1938

FROM HELWAN OBSERVATORY, EGYPT

$\phi = 29^{\circ} 51' N$        $\lambda = 21^{\circ} 20' E$        $H = 115m.$

Director... Dr. M.R. Madwar

Seismograph Milno-Shaw recording E-W motion

Theoretical magnification = 250

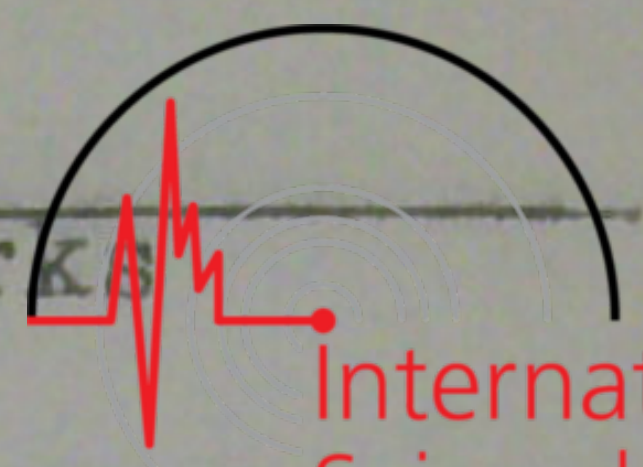
Period of undamped pendulum = 12.0 s.

Times are expressed in Greenwich Civil Mean Time



Date	Phase	G.M.T.	Period	Amplitude	Remarks	
				$A_F$		
		h	m	s		
4	iP e F	3	52	06		
			53	50		
		4.3				
5	iP i e PP iS PPS e SS M F	8	56	02		Dilatation
				45		
			58	30		
			59	(30)		
		9	06	45		
			08	05		
			09	09		
			12	42		
			31	15	25	+ 175
						Confused with the succeeding earthquake
5	iP PP i iS SS M F	11	02	55		Dilatation
			06	(45)		
			10	02		
			13	45		
			19	(40)		
			49	22	15	+ 125
		15.2				
5	e e e F	21	36	27		
			40	03		
			46	54		
		22.0				
6	iP PP iS M F	9	06	36		Dilatation
			09	58		
			17	12		
			56	36	18	+ 76
		13.5				
6	iPg Sg F	15	36	34		"
				41		Local ( Felt in Cairo)
		15.7				$\Delta = 50$ km
						Az = 65° NE of Helwan
6	Pg Sg S* Sn F	16	00	06		Local ( not felt)
				10		
				12		
				15		
		16, 01				
6	Pg e F	16	35	30		Local ( not felt)
				35		Very weak
		16 36				





Date	Phase	G.M.T.			Period	Amplitude	Remarks
		h	m	s	s	$\frac{A}{E}$	
6	Pg Sg F	17	22	00 05			Local(not felt)
6	e o F	17	31 42	54 30			
		18.6					
6/7	P (PP) i iS i i Ps M F	21	<del>51</del> <b>55</b>	30 05 58 13 24 00 12 37	16	$\pm$ 32	Dilatation
		1.0					
7	i i i e F	1	00	26 36 15 06			Confused with the succeeding earthquake
7	P i i i PP e S M F	1	51	09 21 15 30 33 31 46 30	12	$\pm$ 5	Confused with the succeeding earthquake
7	i e e F	4	28	15 54 12			Preceded by micros.
		6.0					
7	iP e PP e eS F	19	46	21 30 48 00 00			" " "
		21.0					
7	Pg Sg F	22	26	51 56 30			Local(not felt)
9	iP i PP i i S (PS) F	9	28	43 25 12 30 07 30 36			Compression
		11.4					





Date	Phase	G.M.T.			Period	Amplitude	Remarks
		h	m	s	s	$\frac{A}{E}$	
10	P	10	59	30			Dilatation
	i			42			
	PP	11	03	03			
	i		09	59			
	S		10	25			
	Ps		11	25			
	F	12.6					
10	iP	20	32	04			"
	Light spot faint - unreadable seismogram						
11	iP	1	11	06			"
	i			18			
	PP		14	51			
	i		21	40			
	S		22	18			
	PS		23	13			
	F	Confused with the succeeding earthquake					
11	i	3	10	24			"
	i		14	54			
	F	3.7					
11	e	8	44	09			"
	e		48	02			
	F	10.3					
12	iP	15	02	50			Dilatation
	SKS		13	23			
	SKKS		14	07			
	S			35			
	M		47	14	13	$\frac{+}{-} 7$	
	F	17.5					
13	iP	5	06	09			"
	i			20			
	e		16	50			
	e		18	06			
	F	6.7					
13	iP	13	26	20			" $\Delta = 102^\circ$ $h = 100$ km.
	PP			45			
	i		27	10			
	i		28	15			
	SKS		36	52			
	i		37	42			
	S			52			
	SS		38	42			
	i		39	50			
	F	16.0					
13/14	iP	22	44	18			Compression
	i			51			
	i		45	00			
	i		47	48			
	i		48	00			
	PP			31			
	e		49	35			
	e		53	45			





Date : Phase : G.M.T. : Period : Amplitude : Remarks

		h	m	s	s	$\frac{A}{E}$		
13/14 cont.	SKS		54	56				
	S		56	25				
	(PS)		57	40				
	PPS		58	50				
	M	27	36	42	12	$\pm 8$		
	F	2.2						
14	e	2	52	36				
	i		53	06				
	e		59	48				
	F	4.0						
14	eP	5	08	10				
	oS		12	12				
	F	5.8						
14	eP	8	07	04				
	e		04	20				
	F	2.4						
14	e	12	03	27				
	e		04	23				
	e		06	00				
	F	Confused with the succeeding earthquake						
14	e	12	38	09				
	e		39	05				
	e		42	03				
	M	13	19	00	24	$\pm 8$		
	F	15.6						
15	e	10	05	18				
	i			39				
	F	11.2						
15	iP	21	11	50			Dilatation	
	i		12	00				
	PP		14	35				
	i		15	08				
	(PPP)		16	29				
	e		17	31				
	iS		21	15				
	PS			49				
	SS		26	10				
	M		40	20	12	$\pm 30$		
	F	24.0						
16	iP	<del>11</del>	<del>20</del>	<del>51</del>			"	
	PP		24	18				
	(SKS)		31	15				
	S			42				
	F	12.5						
16	i	15	34	09				

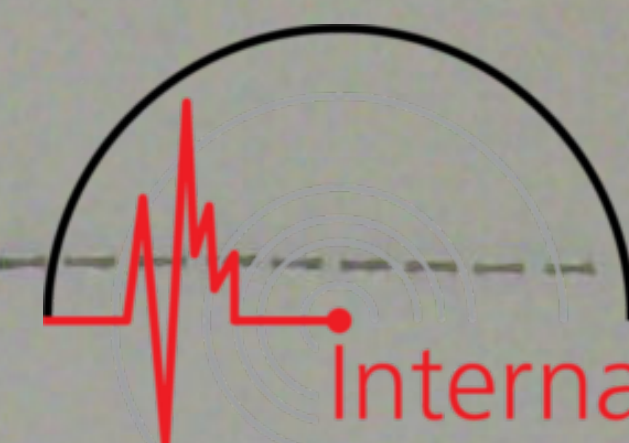




Date : Phase : G.M.T. : Period : Amplitude : Remarks

Date	Phase	G.M.T. (h m s)	Period (s)	Amplitude	Remarks
17	iP PP SKS S PS M F	4 07 59 11 45 18 35 19 18 20 21 56 15	20	± 57	Dilatation
18	e o F	9 09 12 10 06 9.2			
18	e e i F	14 31 20 34 17 40 23 15.6			
18	iP	15 43 51			"
18	iP F	18 42 55 19.9			Compression
19	eP e F	5 52 30 6 03 05 7.3			
21	eP e e (S) e e M F	1 21 03 28 45 29 14 30 35 54 33 30 51 15	15	+ 11	Confused with the succeeding earthquake
21	i i F	1 42 48 43 47 2.9			
21	iP e e E	7 10 59 11 16 20 52 8.2			Dilatation
22	iP i i PP i i i i S PS i M F	1 26 50 27 21 28 00 30 15 30 31 06 33 42 37 30 42 38 35 39 00 2 13 54 5.0	12	± 9	"





Date : Phase : G.M.T. : Period : Amplitude: Remarks

$\frac{A}{B}$

Date	Phase	G.M.T.			Period	Amplitude	Remarks
		h	m	s			
25	o e e F	00	15	08	s	1	
			16	36			
			24	09			
		0.5					
25	o e e F	4	15	24			
			17	24			
			18	51			
		4.6					
25	iF PF e S e PS F	8	33	09			Compression
			36	32			
			43	28			
				42			
			44	00			
			44	35			
		9.8					
25	e F	22	21	30			
		23.1					
29	P PP i S i PS i F	13	52	18			"
			55	48			
				54			
		14	02	36			
				58			
			04	10			
				17			
16.1							
30	iP i PP i S M F	2	42	32	21	+ 19	"
				45			
			45	57			
			53	10			
				25			
		3	23	30			
		6.1					

Tremors were also recorded at :

D	H	D	H	D	H	D	H	D	H
2	23	12	7	13	3, 11	15	15	17	22
19	10	20	18	23	12, 18	24	19	27	3







SEISMOGRAPH RECORDS.

For the Month of December, 1938  
FROM HELWAN OBSERVATORY, EGYPT

= 29° 31' N.     $\lambda$  = 31° 20' E    h = 115 m.



Director : Dr. M.R. Madwar

Seismograph Milne-Shaw recording E-W motion  
Theoretical magnification = 250  
Period of undamped pendulum = 12s.0  
Time are expressed in Greenwich Civil Mean Time.

Date : 1938	Phase :	Time			Period :	Amplitude : AE	Remarks.
		h.	m.	s.			
1	eP	2	26	13	20	+ 11	
	o		32	10			
	e			30			
	PPF		33	15			
	SKS		36	45			
	SKKS		37	45			
	S		38	36			
	M	3	19	35			
F	5.4						
1	e	18	17	06	15	+ 7	
	M		28	33			
	F	18.8					
2	eP	22	23	16	16	+ 6	Preceded by microseisms
	IP		25	15			
	e		30	15			
	S			42			
	e		33	09			
	e		34	25			
	M		48	52			
	F	23.4					
3	iP	12	24	24	18	+ 7	Dilatation
	i			45			
	e		25	15			
	e		27	48			
	PF		28	02			
	SKS		34	49			
	e		35	00			
	e		36	06			
	PS			45			
	M	13	10	32			
	F	14.1					
4	e	16	42	33			
	e		44	54			
	i		45	02			
	F	18.8					
6/7	P	23	12	55			Confused with the succeeding earthquake.
	i		13	25			
	i		14	00			
	PF		15	50			
	PPP		17	52			
	e		19	30			
	(S)		22	57			
	PS		23	41			
	F		24	00			



Date 1938	Phase	Time			Period s.	Amplitude A $\frac{m}{s}$	Remarks
		h.	m.	s.			
6	e i i F	1	11	17 35 42			
				1.6			
7	e e	12	11	06 42			
7	iP e F	13	17	00 25			Dilatation Confused with the succeeding earthquake
7	iP F	15	13	03			Dilatation
				16.0			
8	i F	19	25	24			
				19.6			
9	e F	3	23	21			
				3.5			
9	iP PP SKKS S F	4	08	39 28 45 02			Dilatation Confused with the succeeding earthquake
9	iP i F	5	14	52 00			Dilatation
				6.7			
13	iP i i PP i S e e F	17	38	15 28 54 38 40 52 38 40			Dilatation
				19.0			
14	e i i F	5	05	54 30 35			Near earthquake
				5 08			
14	iP i F	13	17	18 36			Dilatation
				13.4			
15	eP i i F	9	31	07 12 25			
				11.2			
16	iP i F	11	05	24 11			Dilatation
				11.6			



Date : 1938	Phase :	Time	Period:	Amplitude :	Remarks
		h m s	s	$\frac{A}{T}$	
16	P	17 40 51			
	e	41 10			
	P <sub>2</sub>	44 15			
	SKS	51 12			
	e	53 27			
	(SS)	18 02 34			
	M	42 42	15	$\pm 43$	
	F	22.0			
16/17	eP	23 34 15			
	e	24			
	(P <sub>2</sub> )	37 27			
	e	54			
	i	38 12			
	M	24 34 24	18	$\pm 10$	
	F	2.5			
17	iP	16 44 18			Dilatation
	i	28			
	PP	46 15			
	i	24			
	S	51 42			
	i	54 09			
	F	18.0			
18	i	7 38 10			
	M	8 03 33	12	$\pm 5$	
	F	9.0			
18	iP	21 58 27			Compression
	PP	22 01 45			
	i	08 48			
	S	09 03			
	F	23.3			
19	P	18 36 26			Dilatation
	e	36			
	e	39 06			
	S	47 06			
	IS	48 10			
	F				Confused with the succeeding earthquake
19	iP	19 01 57			Compression
	i	02 12			
	PP	36			
	PPP	54			
	e	06 08			
	e	07 41			
	M	14 35	9	$\pm 7$	
	F	20.2			
20	eP	9 16 18			
	e	17 09			
	e	19 24			
	S	45			
	SS	20 18			
	F	9.8			



Date : 1938	Phase :	Time	Period :	Amplitude :	Remarks
		h m s	s	$\frac{A}{E}$	
21	e F	12 31 09			Confused with the succeeding earthquake
21	iP i SKS S PS PPS M F	12 39 57 40 09 50 25 51 02 52 03 36 13 20 12 15.2	18	+ 7	Compression
22	i i F	17 08 50 18 51 18.1			
23	e e F	18 31 54 38 40 18.8			
25	e F	23 34 44 23.6			
26	eP F	6 30 00 8.0			
26	eP e F	22 05 06 15 22.5			
30	iP i e F	2 40 33 51 50 56 4.5			Compression

Tremors were also recorded at :

I	H	D	H	I	H	I	H	D	H
8	19	9	1, 14	10	00, 19	12	11	13	13
14	11	15	00	16	5	19	23	25	00
26	11								

*Amir*