

N.º I.

Mes de Enero de 1924.

SAN FERNANDO

BOLETIN SÍSMICO

DEL

Instituto y Observatorio de Marina

$\varphi = 36^\circ 27' 42''$

$\lambda = 6^\circ 12' 20'' W$

$a = 28^m$

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

	Componen- te.	Masa kg	Periodo s	Amplifica- ción.	Velocidad de registro.		ϵ	$\frac{r}{T_0^2}$	
					m	mm			
Péndulo horizontal	Milne	N-S	20	7	I	4	>	>	1mm 0",40
Idem idem	idem	E-W	17	7	I	I	>	>	1mm 0",50
Idem vertical	Observatorio	E-W	700	2,1	280	I 15	>	0,061	
Idem horizontal	Bifilar	E-W	60	24	13	I 6	>	0,001	

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL (GREENWICH)

Fecha	Fase	Hora	Periodo	AMPLITUD		Δ	Observaciones
				N. S.	E. W.		
		h m s		mm	mm	km	
Enero 7	L (?) M _N	10 58 48 11 02 00		0,30			
> 11	L (?) M _N	0 45 00 0 48 00		0,50			
> 14	P S L M _N M _E F	21 15 00 21 27 00 21 46 30 21 54 30 21 58 00 23 48 00		4,00	2,70	11,500	
> 21	P S L M _N M _E	2 05 36 2 15 42 2 30 30 2 19 00 2 18 30		0,65	0,75	8,800	
> 29	P S L M _N M _E F	2 08 08 2 18 20 2 34 30 2 51 00 2 54 30 3 45 00		7,00	1,00	9,000	

Todos los días, a excepción del 18, hubo intranquilidad.

El Director,

Leon Herrera

SAN FERNANDO

BOLETIN SÍSMICO

DEL

Instituto y Observatorio de Marina

$\varphi = 36^\circ 27' 42''$

$\lambda = 6^\circ 12' 20'' W$

$a = 28^m$

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

	Componen- te.	Masa kg	Periodo s	Amplifica- ción.	Velocidad de registro.		ϵ	$\frac{r}{T_0^2}$	
					m	mm			
Péndulo horizontal	Milne	N-S	20	7	I	4	>	>	1mm 0",40
Idem idem	idem	E-W	17	7	I	I	>	>	1mm 0",50
Idem vertical	Observatorio	E-W	700	2,1	I	15	>	0,061	
Idem horizontal	Biflar	E-W	60	24	I	6	>	0,001	

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL (GREENWICH)

Fecha	Fase	Hora h m s	Periodo	AMPLITUD		Δ km	Observaciones
				N. S.	E. W.		
				mm	mm		
Febrero 2	S (?)	23 23 00					
	L (?)	23 29 00					
	M _N	23 31 30		0,40			
	M _E	23 31 00			5,300 (?)		
> 11	L (?)	7 03 30					
	M _N	7 10 30		0,65			
	M _E	7 12 00			0,85		
> 14	L (?)	0 05 00					
	M _N	0 06 30		0,50			
> 18	P	17 10 33					
	S	17 17 55					
	L	17 22 00					
	M _N	17 30 00					
	M _E	17 28 00				5,700	
> 19	P (?)	7 09 30					
	S	7 14 12					
	L	7 17 00					
	M _N	7 19 00					
	M _E	7 19 30				3,600 (?)	
> 22	S (?)	15 15 18					
	M _E	15 38 00					
> 29	P (?)	8 50 24					
	S (?)	9 02 48					
	L (?)	9 26 00					
	M _N	9 36 30		0,60			
	M _E	9 39 30			0,40		
	F	10 26 00				12,100 (?)	

El Director,

Leon Herrera



N.º 3.

Mes de Marzo de 1924.

SAN FERNANDO

BOLETIN SÍSMICO

DEL

Instituto y Observatorio de Marina

 $\varphi = 36^{\circ} 27' 42''$
 $\lambda = 6^{\circ} 12' 20'' W$
 $a = 28^m$

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

	Componen- te.	Masa	Periodo	Amplifica- ción.	Velocidad de registro.		ϵ	$\frac{r}{T_0^2}$	
		kg	s		m	mm			
Péndulo horizontal	Milne	N—S	»	20	7	I 4	»	»	1 mm 0",40
Idem idem	idem	E—W	»	17	7	I 1	»	»	1 mm 0",50
Idem vertical	Observatorio	E—W	700	2,1	280	I 15	»	0,061	
Idem horizontal	Biñlar	E—W	60	24	13	I 6	»	0,001	

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL (GREENWICH)

Fecha	Fase	Hora	Periodo	AMPLITUD		Δ	Observaciones
				N. S.	E. W.		
Marzo 4	P	10 ^h 19 ^m 30 ^s		mm	mm	8,450	
	S	10 29 12					
	L	10 40 00					
	M _N	10 50 00	0,50				
	M _E	10 53 00		2,00			
» 4	S (?)	12 04 12				9,500 (?)	
	L	12 20 30					
	M _N	12 26 00	1,00				
» 11	S	11 02 44				8,250	
	L	11 15 30					
	M _N	11 26 30	0,50				
	F	13 00 00					
» 14	L (?)	3 15 00					
	M _N	3 24 30	0,40				
» 15	S	10 55 25					
	L	11 18 00					
	M _N	11 23 00	3,75				
	F	13 20 00					
» 16	S	10 21 55					
	M _E	10 25 30			2,00		
	F	10 45 00					

Desde el día 17, quedaron interrumpidos los servicios de los sismógrafos, por estar verificandose obras en el local en que estan instalados.

El Director,



N.º 4.

Mes de Abril de 1924.

SAN FERNANDO

BOLETIN SÍSMICO

DEL

Instituto y Observatorio de Marina

 $\varphi = 36^{\circ} 27' 42''$
 $\lambda = 6^{\circ} 12' 20'' W$
 $a = 28^m$

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

		Componen- te.	Masa kg	Periodo s	Amplifica- ción.	Velocidad de registro. m mm	ϵ	$\frac{r}{T_0^2}$	
Péndulo horizontal	Milne	N-S	»	20	7	I 4	»	»	1mm 0",40
Idem idem	idem	E-W	»	17	7	I I	»	»	1mm 0",50
Idem vertical	Observatorio	E-W	700	2,1	280	I 15	»	0,061	
Idem horizontal	Bifilar	E-W	60	24	13	I 6	»	0,001	

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL (GREENWICH)

Fecha	Fase	Hora	Periodo	AMPLITUD		Δ	Observaciones
				N. S.	E. W.		
		h m s		mm	mm	km	
Abril 13	P (?)	14 05 35		0,55	0,30	11,500 (?)	
	S (?)	14 17 35					
	M _N	15 05 30					
	M _E	15 03 30					
	F	16 25 00					
» 14	P	16 40 16		19,50		9,150	
	S	16 50 35					
	M _N	17 40 00					
	M _E	17 44 00					
	F	21 35 00					
» 20	P	14 36 25		0,60	0,55	6,600	
	S _i	14 44 35					
	L	14 55 00					
	M _N	15 04 00					
	M _E	15 00 30					
» 21	P	20 13 50			0,40	8,600	
	S _i	20 23 40					
	L	20 37 00					
	M _K	20 56 00					
» 29	L (?)	21 43 30		0,85	.		
	M _N	21 48 30					
	F	21 35 00					
» 30	S (?)	5 23 30		0,75			
	L (?)	5 36 30					
	M _N	5 48 30					
» 30	S (?)	6 16 30		1,00			
	L (?)	6 35 30					
	M _N	6 49 00					
	F	7 52 00					

Terminadas las obras verificadas en el local en que estan instalados los sismógrafos, se renaudó el sevicio de estos el día 13.

Todos los días desde el 13 en adelante, hubo intranquilidad.

El Director,



Leon Herrera

N.º 5.

Mes de Mayo de 1924.

SAN FERNANDO

BOLETIN SÍSMICO

DEL

Instituto y Observatorio de Marina

 $\varphi = 36^\circ 27' 42''$
 $\lambda = 6^\circ 12' 20'' W$
 $a = 28^m$

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

			Componen- te.	Masa kg	Periodo s	Amplifica- ción.	Velocidad de registro. m mm	ϵ	$\frac{r}{T_0^2}$
Péndulo horizontal	Milne		N-S	»	20	7	I 4	»	»
Idem idem	idem		E-W	»	17	7	I I	»	»
Idem vertical	Observatorio		E-W	700	2,1	280	I 15	»	0,061
Idem horizontal	Bifilar		E-W	60	24	13	I 6	»	0,001

1mm 0",40

1mm 0",50

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL (GREENWICH)

Fecha	Fase	Hora h m s	Periodo	AMPLITUD		Δ km	Observaciones
				N. S. mm	E. W. mm		
Mayo 1	P	20 06 20				8,550	
	S	20 16 08					
	L	20 29 00					
	M _N	20 34 00					
	F	22 30 00					
» 4	i P	17 10 55				6,000 (?)	
	S (?)	17 18 30					
	L	17 26 00					
	F	20 45 00					
» 6	S (?)	7 06 28				0,55	
	L (?)	7 13 00					
	M _N	7 20 00					
» 6	M _N	17 19 30				1,50	Sismogramas muy confusos.
» 10	P (?)	3 11 23					Sismogramas muy débiles.
» 14	L (?)	2 22 30				0,50	
	M _N	2 30 30					
	M _E	2 37 30			0,25		
» 17	S (?)	4 56 30				0,60	
	L (?)	5 07 30					
	M _N	5 15 30					
» 17	S (?)	6 20 24				0,65	
	L (?)	6 33 00					
	M _N	6 37 00					
» 20	M _N	5 47 00				0,55	
	L (?)	18 42 00				1,40	
» 22	M _N	18 47 30					
	» 24	L (?)	3 05 00				
M _N		3 35 00					
» 28	P (?)	10 03 22				9,800 (?)	
	i S (?)	10 14 13					
	L (?)	10 28 00					
	F	12 35 00					
» 31	S (?)	13 00 00				0,75	
	L (?)	13 07 30					
	M _N	13 12 30					
	M _E	13 10 00					

El Director,



BOLETIN SÍSMICO
DEL
INSTITUTO Y OBSERVATORIO DE MARINA
~~~~~  
SAN FERNANDO

$\varphi = 36^\circ 27' 42''$

$\lambda = 6^\circ 12' 20'' W$

$a = 28^m$

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

|                    |              |  | Componen-<br>te. | Masa<br>kg | Periodo<br>s | Amplifica-<br>ción. | Velocidad<br>de registro.<br>m mm | $\epsilon$ | $\frac{r}{T_0^2}$ |           |
|--------------------|--------------|--|------------------|------------|--------------|---------------------|-----------------------------------|------------|-------------------|-----------|
| Péndulo horizontal | Milne        |  | N-S              | »          | 20           | 7                   | I 4                               | »          | »                 | 1mm 0",40 |
| Idem idem          | idem         |  | E-W              | »          | 17           | 7                   | I I                               | »          | »                 | 1mm 0",50 |
| Idem vertical      | Observatorio |  | E-W              | 700        | 2,1          | 280                 | I 15                              | »          | 0,061             |           |
| Idem horizontal    | Bifilar      |  | E-W              | 60         | 24           | 13                  | I 6                               | »          | 0,001             |           |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Fecha    | Fase           | Hora<br>h m s | Periodo | AMPLITUD    |             | $\Delta$<br>km | Observaciones |
|----------|----------------|---------------|---------|-------------|-------------|----------------|---------------|
|          |                |               |         | N. S.<br>mm | E. W.<br>mm |                |               |
| Junio 26 | P              | 1 57 35       |         | 18,2        |             | 14,100         |               |
|          | S              | 2 11 00       |         |             |             |                |               |
|          | L              | 2 37 00       |         |             |             |                |               |
|          | M <sub>N</sub> | 3 07 00       |         |             |             |                |               |
|          | M <sub>E</sub> | 3 20 00       |         |             |             |                |               |
|          | F              | 5 35 00       |         |             |             |                |               |
| » 29     | M <sub>N</sub> | 19 46 00      |         |             |             |                |               |
| » 30     | L (?)          | 3 57 00       |         |             |             |                |               |
| » 30     | P              | 15 57 34      |         | 3,40        |             | 9,450          |               |
|          | S              | 16 08 07      |         |             |             |                |               |
|          | L              | 16 26 00      |         |             |             |                |               |
|          | M <sub>N</sub> | 16 42 00      |         |             |             |                |               |
|          | M <sub>E</sub> | 16 39 00      |         |             |             |                |               |
|          | F              | 17 40 00      |         |             |             |                |               |

Todos los días, hubo intranquilidad.

El Director,



*Leon Herrera*

# BOLETIN SÍSMICO

DEL

## INSTITUTO Y OBSERVATORIO DE MARINA

### SAN FERNANDO

$\varphi = 36^{\circ} 27' 42''$

$\lambda = 6^{\circ} 12' 20'' W$

$\alpha = 28^m$

Subsuelo: ROCA CALCÁREA.

### INSTRUMENTOS

|                    | Componen-te. | Masa | Periodo | Amplifica-ción. | Velocidad de registro. |    | $\epsilon$ | $\frac{r}{T_0^2}$ |           |
|--------------------|--------------|------|---------|-----------------|------------------------|----|------------|-------------------|-----------|
|                    |              | kg   | s       |                 | m                      | mm |            |                   |           |
| Péndulo horizontal | Milne        | N-S  | 20      | 7               | I                      | 4  | »          | »                 | 1mm 0",40 |
| Idem idem          | idem         | E-W  | 17      | 7               | I                      | I  | »          | »                 | 1mm 0",50 |
| Idem vertical      | Observatorio | E-W  | 700     | 2,1             | 280                    | I  | 15         | »                 | 0,061     |
| Idem horizontal    | Bifilar      | E-W  | 60      | 24              | 13                     | I  | 6          | »                 | 0,001     |

### TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL (GREENWICH)

| Fecha   | Fase                                                                   | Hora                                                                      | Periodo | AMPLITUD |       | $\Delta$   | Observaciones |
|---------|------------------------------------------------------------------------|---------------------------------------------------------------------------|---------|----------|-------|------------|---------------|
|         |                                                                        |                                                                           |         | N. S.    | E. W. |            |               |
|         |                                                                        | h <sup>r</sup> m <sup>s</sup>                                             |         | mm       | mm    | km         |               |
| Julio 3 | P<br>S<br>L<br>M <sub>N</sub>                                          | 4 51 18<br>5 0 40<br>5 10 00<br>5 26 30                                   |         | 5,45     |       | 8,000      |               |
| » 5     | e<br>S (?)<br>M <sub>N</sub>                                           | 23 27 30<br>23 28 30<br>23 52 00                                          |         | 0,50     |       |            |               |
| » 6     | P<br>S<br>L<br>M <sub>N</sub><br>F                                     | 14 30 20<br>14 39 30<br>14 52 00<br>15 7 00<br>17 31 00                   |         | 1,40     |       | 7,800      |               |
| » 6     | P<br>S<br>L<br>M <sub>N</sub><br>F                                     | 18 42 15<br>18 50 20<br>18 58 00<br>19 9 00<br>19 50 00                   |         | 1,25     |       | 6,550      |               |
| » 7     | e<br>M <sub>N</sub>                                                    | 3 49 48<br>4 6 30                                                         |         | 0,90     |       |            |               |
| » 11    | eP<br>S<br>L<br>M <sub>N</sub><br>F                                    | 19 55 35<br>20 5 05<br>20 17 30<br>20 38 30<br>20 26 00                   |         | 5,60     |       | 8,160      |               |
| » 12    | eP<br>S (?)<br>L (?)<br>M <sub>N</sub><br>M <sub>E</sub>               | 15 22 25<br>15 30 35<br>15 39 00<br>15 50 30<br>15 49 00                  |         | 1,80     |       | 6,700 (?)  |               |
| » 22    | P<br>S<br>L<br>M <sub>N</sub><br>F                                     | 4 16 40<br>4 25 50<br>4 45 00<br>4 54 30<br>5 40 00                       |         | 0,75     |       | 7,700      |               |
| » 22    | S (?)<br>L (?)<br>M <sub>N</sub><br>M <sub>E</sub><br>F                | 15 7 42<br>15 20 30<br>15 23 00<br>15 23 00<br>16 25 00                   |         | 1,35     |       |            |               |
| » 24    | P (?)<br>PR<br>S (?)<br>L (?)<br>M <sub>N</sub><br>M <sub>E</sub><br>F | 5 15 40<br>5 20 00<br>5 26 45<br>5 40 00<br>6 45 00<br>6 36 00<br>8 40 00 |         | 4,65     |       | 10,200 (?) |               |
| » 28    | e<br>M <sub>N</sub><br>M <sub>E</sub>                                  | 5 40 20<br>6 39 00<br>6 38 30                                             |         |          |       |            |               |

El Director,



*Leon Herrera*

BOLETIN SÍSMICO  
DEL  
INSTITUTO Y OBSERVATORIO DE MARINA

SAN FERNANDO

$\varphi = 36^\circ 27' 42''$

$\lambda = 6^\circ 12' 20'' W$

$\alpha = 28^m$

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

|                    | Componen-<br>te. | Masa | Periodo | Amplifica-<br>ción. | Velocidad<br>de registro. |    | $\epsilon$ | $\frac{r}{T_0^2}$ |            |
|--------------------|------------------|------|---------|---------------------|---------------------------|----|------------|-------------------|------------|
|                    |                  | kg   | s       |                     | m                         | mm |            |                   |            |
| Péndulo horizontal | Milne            | N-S  | 20      | 7                   | I                         | 4  | »          | »                 | 1 mm 0",40 |
| Idem idem          | idem             | E-W  | 17      | 7                   | I                         | I  | »          | »                 | 1 mm 0",50 |
| Idem vertical      | Observatorio     | E-W  | 700     | 2,1                 | 280                       | I  | 15         | »                 | 0,061      |
| Idem horizontal    | Bifilar          | E-W  | 60      | 24                  | 13                        | I  | 6          | »                 | 0,001      |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Fecha    | Fase                                                                    | Hora                                                                                       | Periodo | AMPLITUD |       | $\Delta$   | Observaciones             |
|----------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------|----------|-------|------------|---------------------------|
|          |                                                                         |                                                                                            |         | N. S.    | E. W. |            |                           |
|          |                                                                         | h m s                                                                                      |         | mm       | mm    | km         |                           |
| Agosto 6 | M <sub>N</sub>                                                          | 1 53 00                                                                                    |         | 0,60     |       |            |                           |
| » 10     | P<br>PR<br>S<br>SR(?)<br>L<br>M <sub>N</sub><br>M <sub>E</sub><br>F     | 6 31 51<br>6 37 30<br>6 48 12<br>6 58 40<br>7 40 00<br>7 54 00<br>7 54 00<br>9 30 00       |         | 1,30     |       | 19,000 (?) |                           |
| » 13     | L (?)<br>M <sub>N</sub><br>M <sub>E</sub><br>F                          | 10 49 00<br>11 00 00<br>10 57 00<br>12 00 00                                               |         | 0,55     |       |            |                           |
| » 13     | S (?)<br>L (?)<br>M <sub>N</sub><br>M <sub>E</sub>                      | 13 54 30<br>14 16 30<br>14 31 00<br>14 23 00                                               |         | 0,70     |       | 11,500 (?) |                           |
| » 14     | PR(?)<br>S (?)<br>L (?)<br>M <sub>N</sub>                               | 0 27 42<br>0 41 00<br>1 27 00<br>1 39 30                                                   |         | 0,60     |       | 18,000 (?) |                           |
| » 14     | P (?)<br>PR(?)<br>S<br>SR<br>L<br>M <sub>N</sub><br>M <sub>E</sub><br>F | 18 16 40<br>18 21 00<br>18 27 25<br>18 36 00<br>18 55 30<br>19 5 30<br>19 4 00<br>21 15 00 |         | 6,25     |       | 9,700 (?)  |                           |
| » 14-15  | P (?)<br>L<br>M <sub>N</sub><br>M <sub>E</sub>                          | 23 45 20<br>0 25 30<br>0 35 30<br>0 35 00                                                  |         | 1,40     |       |            | Réplica del anterior. (?) |
| » 17     | S (?)<br>SR(?)<br>L<br>M <sub>N</sub><br>M <sub>E</sub>                 | 2 21 54<br>2 28 30<br>2 44 30<br>3 18 30<br>3 18 30                                        |         | 1,40     |       | 12,000 (?) |                           |
| » 25     | P<br>PR<br>S<br>SR<br>L<br>M <sub>N</sub><br>M <sub>E</sub><br>F        | 2 33 30<br>2 37 35<br>2 45 24<br>2 51 40<br>3 08 00<br>3 15 30<br>3 16 30<br>4 09 00       |         | 2,00     |       | 11,350     |                           |



| Fecha          | Fase           | Hora     | Periodo | AMPLITUD |       | $\Delta$   | Observaciones |
|----------------|----------------|----------|---------|----------|-------|------------|---------------|
|                |                |          |         | N. S.    | E. W. |            |               |
| Agosto 25      | SR(?)          | 15 07 30 |         | mm       | mm    | 12,000 (?) |               |
|                | L              | 15 29 00 |         |          |       |            |               |
|                | M <sub>N</sub> | 15 38 00 |         | 1,80     |       |            |               |
|                | M <sub>E</sub> | 15 31 30 |         |          |       |            |               |
|                | F              | 16 30 00 |         |          |       |            |               |
| » 25-26        | M <sub>N</sub> | 0 07 30  |         |          |       |            |               |
|                | M <sub>E</sub> | 0 04 00  |         |          |       |            |               |
| » 27           | P              | 22 38 25 |         |          |       | 2,330      |               |
|                | S              | 22 42 16 |         |          |       |            |               |
|                | L              | 22 43 30 |         | 0,75     |       |            |               |
|                | M <sub>N</sub> | 22 45 00 |         |          |       |            |               |
|                | M <sub>E</sub> | 22 44 00 |         |          |       |            |               |
| » 29           | F              | 23 10 00 |         |          |       |            |               |
|                | M <sub>N</sub> | 0 56 00  |         | 0,50     |       |            |               |
|                | M <sub>E</sub> | 0 57 00  |         |          |       |            |               |
| » 30           | F              | 1 10 00  |         |          |       |            |               |
|                | P (?)          | 3 24 35  |         |          |       | 15,000 (?) |               |
|                | PR(?)          | 3 28 30  |         |          |       |            |               |
|                | S (?)          | 3 40 00  |         |          |       |            |               |
|                | L              | 4 00 00  |         | 4,10     |       |            |               |
| M <sub>N</sub> | 4 22 00        |          |         |          |       |            |               |
| F              | 5 50 00        |          |         |          |       |            |               |

El Director,



*Leon Ferrer*

N.º 9.

Mes de Septiembre de 1924.

BOLETIN SÍSMICO  
DEL  
INSTITUTO Y OBSERVATORIO DE MARINA  
SAN FERNANDO

$\varphi = 36^{\circ} 27' 42''$

$\lambda = 6^{\circ} 12' 20'' W$

$a = 28^m$

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

|                    |              |  | Componen-<br>te. | Masa<br>kg | Periodo<br>s | Amplifica-<br>ción. | Velocidad<br>de registro.<br>m mm | $\epsilon$ | $\frac{r}{T_0^2}$ |
|--------------------|--------------|--|------------------|------------|--------------|---------------------|-----------------------------------|------------|-------------------|
| Péndulo horizontal | Milne        |  | N-S              | »          | 20           | 7                   | I 4                               | »          | »                 |
| Idem idem          | idem         |  | E-W              | »          | 17           | 7                   | I I                               | »          | »                 |
| Idem vertical      | Observatorio |  | E-W              | 700        | 2,1          | 280                 | I 15                              | »          | 0,061             |
| Idem horizontal    | Bifilar      |  | E-W              | 60         | 24           | 13                  | I 6                               | »          | 0,001             |

1 mm 0",40

1 mm 0",50

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Fecha     | Fase           | Hora<br>h m s | Periodo | AMPLITUD    |             | $\Delta$<br>km | Observaciones |
|-----------|----------------|---------------|---------|-------------|-------------|----------------|---------------|
|           |                |               |         | N. S.<br>mm | E. W.<br>mm |                |               |
| Sept.º 13 | P              | 14 41 28      |         | 9,10        |             | 4,100          |               |
|           | S              | 14 47 23      |         |             |             |                |               |
|           | L              | 14 50 30      |         |             |             |                |               |
|           | M <sub>N</sub> | 15 01 30      |         |             |             |                |               |
|           | M <sub>E</sub> | 14 55 30      |         |             |             |                |               |
|           | F              | 15 40 00      |         |             |             |                |               |
| » 14      | S (?)          | 13 37 00      |         | 1,00        |             |                |               |
|           | L              | 14 08 30      |         |             |             |                |               |
|           | M <sub>N</sub> | 14 19 00      |         |             |             |                |               |
|           | M <sub>E</sub> | 14 19 00      |         |             |             |                |               |
| » 16      | P (?)          | 2 46 17       |         | 0,90        |             | 6,250 (?)      |               |
|           | S (?)          | 2 54 05       |         |             |             |                |               |
|           | L (?)          | 3 12 30       |         |             |             |                |               |
|           | M <sub>N</sub> | 3 18 00       |         |             |             |                |               |
|           | M <sub>E</sub> | 3 17 00       |         |             |             |                |               |
|           | F              | 3 35 00       |         |             |             |                |               |
| » 28      | P              | 13 38 46      |         | 0,95        |             | 2,250          |               |
|           | S              | 13 42 30      |         |             |             |                |               |
|           | L              | 13 43 30      |         |             |             |                |               |
|           | M <sub>N</sub> | 13 45 30      |         |             |             |                |               |
|           | M <sub>E</sub> | 13 45 00      |         |             |             |                |               |
|           | F              | 14 15 00      |         |             |             |                |               |

Todos los días, hubo intranquilidad.

El Director,



*Leon Herrera*

BOLETIN SÍSMICO

DEL

INSTITUTO Y OBSERVATORIO DE MARINA

SAN FERNANDO

$\varphi = 36^{\circ} 27' 42''$

$\lambda = 6^{\circ} 12' 20'' W$

$a = 28^m$

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

|                    | Componen-<br>te. | Masa<br>kg | Periodo<br>s | Amplifica-<br>ción. | Velocidad<br>de registro. |    | $\epsilon$ | $\frac{r}{T_0^2}$ |           |
|--------------------|------------------|------------|--------------|---------------------|---------------------------|----|------------|-------------------|-----------|
|                    |                  |            |              |                     | m                         | mm |            |                   |           |
| Péndulo horizontal | Milne            | N-S        | 20           | 7                   | I                         | 4  | »          | »                 | 1mm 0",40 |
| Idem idem          | idem             | E-W        | 17           | 7                   | I                         | I  | »          | »                 | 1mm 0",50 |
| Idem vertical      | Observatorio     | E-W        | 700          | 2,1                 | 280                       | I  | 15         | »                 | 0,06I     |
| Idem horizontal    | Bifilar          | E-W        | 60           | 24                  | 13                        | I  | 6          | »                 | 0,00I     |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Fecha     | Fase           | Hora     | Periodo | AMPLITUD |       | $\Delta$  | Observaciones           |
|-----------|----------------|----------|---------|----------|-------|-----------|-------------------------|
|           |                |          |         | N. S.    | E. W. |           |                         |
| Octubre 8 | P o S (?)      | 20 54 31 |         | 0,80     |       |           |                         |
|           | S o SR(?)      | 21 03 39 |         |          |       |           |                         |
|           | L              | 21 15 00 |         |          |       |           |                         |
|           | M <sub>N</sub> | 21 28 00 |         |          |       |           |                         |
|           | M <sub>E</sub> | 21 22 00 |         |          |       |           |                         |
|           | F              | 20 15 00 |         |          |       |           |                         |
| » 12      | P              | 19 42 06 |         | 2,50     |       | 4,800     |                         |
|           | PR             | 19 44 01 |         |          |       |           |                         |
|           | S              | 19 48 38 |         |          |       |           |                         |
|           | L              | 19 54 00 |         |          |       |           |                         |
|           | M <sub>N</sub> | 20 01 00 |         |          |       |           |                         |
|           | M <sub>E</sub> | 20 00 00 |         |          |       |           |                         |
| » 13      | eP             | 16 27 38 |         | 0,90     |       | 6,200 (?) |                         |
|           | S (?)          | 16 36 08 |         |          |       |           |                         |
|           | L              | 16 44 00 |         |          |       |           |                         |
|           | M <sub>N</sub> | 16 49 30 |         |          |       |           |                         |
|           | M <sub>E</sub> | 16 47 00 |         |          |       |           |                         |
|           | F              | 17 40 00 |         |          |       |           |                         |
| » 14      | eP             | 5 07 18  |         | 2,25     |       | 3,850     |                         |
|           | S              | 5 13 07  |         |          |       |           |                         |
|           | L              | 5 17 00  |         |          |       |           |                         |
|           | M <sub>N</sub> | 5 20 00  |         |          |       |           |                         |
|           | M <sub>E</sub> | 5 24 00  |         |          |       |           |                         |
|           | F              | 5 24 00  |         |          |       |           |                         |
| » 18      | P              | 22 48 17 |         |          |       | <100      |                         |
|           | S              | 22 48 37 |         |          |       |           |                         |
|           | M <sub>N</sub> | 22 49 00 |         |          |       |           |                         |
|           | M <sub>E</sub> | 22 49 30 |         |          |       |           |                         |
|           | F              | 22 55 00 |         |          |       |           |                         |
|           | F              | 22 55 00 |         |          |       |           |                         |
| » 18      | eP             | 23 17 27 |         | 0,50     |       | 8,500     |                         |
|           | S              | 23 27 12 |         |          |       |           |                         |
|           | L              | 23 41 00 |         |          |       |           |                         |
|           | M <sub>N</sub> | 23 50 00 |         |          |       |           |                         |
|           | M <sub>N</sub> | 23 50 00 |         |          |       |           |                         |
|           | M <sub>N</sub> | 23 50 00 |         |          |       |           |                         |
| » 19-20   | eP             | 23 58 50 |         |          |       | 3,600     |                         |
|           | eS             | 0 04 14  |         |          |       |           |                         |
|           | L (?)          | 0 08 30  |         |          |       |           |                         |
| » 20      | eP             | 8 51 30  |         | 0,50     |       | 9,450     |                         |
|           | S              | 9 02 02  |         |          |       |           |                         |
|           | L (?)          | 9 14 30  |         |          |       |           |                         |
|           | M <sub>N</sub> | 9 10 30  |         |          |       |           |                         |
|           | M <sub>N</sub> | 9 10 30  |         |          |       |           |                         |
| » 20      | eP             | 20 05 53 |         | 0,90     |       | 9,100     |                         |
|           | S              | 20 16 10 |         |          |       |           |                         |
|           | L              | 20 45 00 |         |          |       |           |                         |
|           | M <sub>N</sub> | 20 48 00 |         |          |       |           |                         |
|           | M <sub>E</sub> | 20 49 00 |         |          |       |           |                         |
|           | F              | 21 50 00 |         |          |       |           |                         |
| » 25      | ?              | 19 13 42 |         | 0,24     |       |           | Fases no identificadas. |
|           | ?              | 19 17 18 |         |          |       |           |                         |
|           | ?              | 19 21 42 |         |          |       |           |                         |
|           | M <sub>N</sub> | 19 23 00 |         |          |       |           |                         |
|           | M <sub>E</sub> | 19 22 00 |         |          |       |           |                         |
|           | F              | 19 51 00 |         |          |       |           |                         |
| » 27      | ePR(?)         | 20 30 18 |         |          |       |           |                         |
|           | eS (?)         | 20 39 42 |         |          |       |           |                         |
|           | L              | 21 01 00 |         |          |       |           |                         |
|           | M <sub>N</sub> | 21 19 00 |         |          |       |           |                         |
|           | M <sub>N</sub> | 21 19 00 |         |          |       |           |                         |

Todos los días, hubo intranquilidad.

El Director,



*Ben Henares*

BOLETIN SÍSMICO  
DEL  
INSTITUTO Y OBSERVATORIO DE MARINA  
SAN FERNANDO

$\varphi = 36^{\circ} 27' 42''$        $\lambda = 6^{\circ} 12' 20'' W$        $a = 28^m$       Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

|                    | Componen-<br>te.      | Masa<br>kg | Periodo<br>s | Amplifica-<br>ción. | Velocidad<br>de registro. |    | $\epsilon$ | $\frac{r}{T_0^2}$ |           |
|--------------------|-----------------------|------------|--------------|---------------------|---------------------------|----|------------|-------------------|-----------|
|                    |                       |            |              |                     | m                         | mm |            |                   |           |
| Péndulo horizontal | Milne                 | N-S        | 20           | 7                   | I                         | 4  | »          | »                 | 1mm 0",40 |
| Idem               | idem                  | E-W        | 17           | 7                   | I                         | I  | »          | »                 | 1mm 0",50 |
| Idem               | vertical Observatorio | E-W        | 700          | 2,1                 | 280                       | I  | 15         | »                 | 0,06I     |
| Idem               | horizontal Bifilar    | E-W        | 60           | 24                  | 13                        | I  | 6          | »                 | 0,00I     |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Fecha   | Fase  | Hora     | Periodo | AMPLITUD |       | $\Delta$ | Observaciones |
|---------|-------|----------|---------|----------|-------|----------|---------------|
|         |       |          |         | N. S.    | E. W. |          |               |
|         |       |          |         | mm       | mm    |          |               |
| Nov.e 1 | $M_N$ | 5 39 30  |         | 0,50     |       | km       |               |
| » 5     | S (?) | 18 58 13 |         |          |       |          |               |
|         | $M_E$ | 19 05 00 |         |          |       |          |               |
|         | F     | 19 15 00 |         |          |       |          |               |
| » 13    | SR(?) | 9 49 00  |         |          |       |          |               |
|         | L (?) | 10 03 00 |         |          |       |          |               |
|         | $M_N$ | 10 18 00 |         | 0,55     |       |          |               |
| » 20    | P     | 20 33 56 |         |          |       |          |               |
|         | i S   | 20 39 03 |         |          |       |          |               |
|         | L     | 20 42 00 |         |          |       |          |               |
|         | $M_N$ | 20 46 00 |         | 1,75     |       |          |               |
|         | $M_E$ | 20 45 00 |         |          |       |          |               |
|         | F     | 21 30 00 |         |          |       | 3,350    |               |

Todos los días, hubo intranquilidad.

El Director,



*Leon Herrera*

BOLETIN SÍSMICO  
DEL  
INSTITUTO Y OBSERVATORIO DE MARINA  
SAN FERNANDO

$\varphi = 36^{\circ} 27' 42''$        $\lambda = 6^{\circ} 12' 20'' W$        $a = 28^m$       Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

|                    | Componen-<br>te. | Masa | Periodo | Amplifica-<br>ción. | Velocidad<br>de registro. |    | $\epsilon$ | $\frac{r}{T_0^2}$ |            |
|--------------------|------------------|------|---------|---------------------|---------------------------|----|------------|-------------------|------------|
|                    |                  | kg   | s       |                     | m                         | mm |            |                   |            |
| Péndulo horizontal | Milne            | N-S  | 20      | 7                   | 1                         | 4  | »          | »                 | 1 mm 0",40 |
| Idem idem          | idem             | E-W  | 17      | 7                   | 1                         | 1  | »          | »                 | 1 mm 0",50 |
| Idem vertical      | Observatorio     | E-W  | 700     | 2,1                 | 280                       | 15 | »          | 0,061             |            |
| Idem horizontal    | Bifilar          | E-W  | 60      | 24                  | 13                        | 6  | »          | 0,001             |            |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Fecha   | Fase           | Hora     | Periodo | AMPLITUD |       | $\Delta$  | Observaciones                  |
|---------|----------------|----------|---------|----------|-------|-----------|--------------------------------|
|         |                |          |         | N. S.    | E. W. |           |                                |
|         |                | h m s    |         | mm       | mm    | km        |                                |
| dic.º 7 | ?              | 15 47 48 |         |          |       |           | Fase sin indentificar.<br>Idm. |
|         | ?              | 15 53 00 |         |          |       |           |                                |
|         | M <sub>N</sub> | 15 54 00 |         | 0,55     |       |           |                                |
| » 9     | ?              | 12 33 00 |         |          |       |           | Fase sin indentificar.         |
|         | M <sub>N</sub> | 13 12 30 |         |          |       |           |                                |
| » 11    | S (?)          | 18 24 37 |         |          |       |           | P perdido en el cambio.        |
|         | L              | 18 32 00 |         |          |       |           |                                |
|         | M <sub>N</sub> | 18 36 00 |         | 0,90     |       | 5,800 (?) |                                |
| » 27    | S              | 11 45 45 |         |          |       |           | P perdido en el cambio.        |
|         | L              | 12 14 00 |         |          |       |           |                                |
|         | M <sub>N</sub> | 12 20 00 |         |          |       | 13,500    |                                |
|         | F              | 13 00 00 |         |          |       |           |                                |
| » 28    | P (?)          | 23 00 45 |         |          |       |           | 13,500 (?)                     |
|         | S              | 23 19 30 |         |          |       |           |                                |
|         | SR             | 23 21 31 |         |          |       |           |                                |
|         | L              | 23 46 00 |         |          |       |           |                                |
|         | M <sub>N</sub> | 23 56 30 |         | 1,30     |       |           |                                |
|         | M <sub>E</sub> | 23 51 30 |         |          |       |           |                                |

Todos los días, hubo intranquilidad.

El Director,



*Leon Herrera*