

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

|                    |         | Registro    | Com-<br>ponente | M    | T <sub>0</sub> | V   | $\varepsilon$ | $\frac{r}{T_0^2}$ | Extensión<br>de 1 <sup>m</sup><br>en el registro |
|--------------------|---------|-------------|-----------------|------|----------------|-----|---------------|-------------------|--------------------------------------------------|
|                    |         |             |                 | kg.  | s              |     |               |                   | mm                                               |
| Péndulo horizontal | Milne   | Fotográfico | N—S             | >    | 20             | 7   | 0             | >                 | 4                                                |
| Idem idem          | idem    | Idem        | E—W             | >    | 20             | 7   | 0             | >                 | 4                                                |
| Idem idem          | Bifilar | Mecánico    | E—W             | 1100 | 20             | 200 | 0             | 0,005             | 15                                               |
| Idem idem          | Alfani  | Fotográfico | E—W             | 3    | 8              | 400 | $\infty$      | >                 | 17                                               |
| Idem zenital       | idem    | Idem        | Z               | 3    | 5              | >   | >             | >                 | 17                                               |
| Idem vertical      |         | Mecánico    | E—W             | 700  | 2              | 270 | 0             | 0,060             | 15                                               |

NOTA.—El registro con los péndulos Alfani estuvo interrumpido hasta el 5 de Febrero, por fuertes perturbaciones causadas por corrientes de aire generadas en el interior de la cámara, y que se han evitado encerrándolos en armarios de madera ligera.

Los péndulos Milne sólo han estado en función mientras no lo han estado los Alfani.

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Núm. | Fecha   | Com-<br>ponente | Fase                 | Hora     | T | A     | $\Delta$ | Observaciones                                                       |
|------|---------|-----------------|----------------------|----------|---|-------|----------|---------------------------------------------------------------------|
|      |         |                 |                      | h m s    | s | $\mu$ | km       |                                                                     |
| 1    | Enero   | E               | e P                  | 13 40 27 |   |       | (7.900)  |                                                                     |
|      |         | E               | (PS)                 | 13 50 23 |   |       |          |                                                                     |
|      |         | E               | L                    | 14 4,0   |   |       |          |                                                                     |
| 2    | »       | N               | M                    | 23 35,0  |   |       |          |                                                                     |
|      |         | E               | M                    | 23 27,0  |   |       |          |                                                                     |
| 3    | »       | E               | S                    | 2 11 41  |   |       | 10.000   |                                                                     |
|      |         | E               | SR <sub>2</sub>      | 2 21 03  |   |       |          |                                                                     |
|      |         | N-E             | L                    | 2 31,0   |   |       |          |                                                                     |
|      |         | N               | M                    | 2 47,0   |   |       |          |                                                                     |
|      |         | E               | M                    | 2 41,0   |   |       |          |                                                                     |
| 4    | »       | E               | P                    | 14 47 10 |   |       | 3.000    | A las 14 <sup>h</sup> 58 <sup>m</sup> , saltó la pluma del bifilar. |
|      |         | E               | i S                  | 14 51 57 |   |       |          |                                                                     |
|      |         | N-E             | L                    | 14 54,0  |   |       |          |                                                                     |
|      |         | N-E             | M                    | 14 58,5  |   |       |          |                                                                     |
| 5    | »       | E               | e P                  | 16 25 50 |   |       | 3.000    |                                                                     |
|      |         | N-E             | S                    | 16 30 36 |   |       |          |                                                                     |
|      |         | N-E             | L                    | 16 33,5  |   |       |          |                                                                     |
|      |         | N-E             | M                    | 16 37,0  |   |       |          |                                                                     |
| 6    | »       | E               | e (P <sub>1</sub> )  | 2 27 06  |   |       | (19.000) |                                                                     |
|      |         | E               | (SR <sub>1</sub> )   | 2 51 49  |   |       |          |                                                                     |
|      |         | N-E             | L                    | 3 35,0   |   |       |          |                                                                     |
|      |         | N               | M                    | 3 58,0   |   |       |          |                                                                     |
|      |         | E               | M                    | 3 52,0   |   |       |          |                                                                     |
| 7    | »       | E               | e (PR <sub>1</sub> ) | 12 45 21 |   |       | (11.200) |                                                                     |
|      |         | E               | e (S)                | 12 53 23 |   |       |          |                                                                     |
|      |         | E               | e (SR <sub>1</sub> ) | 13 1 21  |   |       |          |                                                                     |
|      |         | E               | e (SR <sub>2</sub> ) | 13 5 37  |   |       |          |                                                                     |
|      |         | E               | L                    | 13 21,5  |   |       |          |                                                                     |
| 8    | »       | E               | P                    | 7 37 11  |   |       | 9.780    |                                                                     |
|      |         | E               | S                    | 7 47 56  |   |       |          |                                                                     |
|      |         | E               | SR <sub>1</sub>      | 7 53 56  |   |       |          |                                                                     |
|      |         | N-E             | L                    | 8 4,0    |   |       |          |                                                                     |
|      |         | N               | M                    | 8 33,5   |   |       |          |                                                                     |
| 9    | »       | E               | M                    | 8 23,5   |   |       |          |                                                                     |
|      |         | N-E             | M                    | 22 56,5  |   |       |          |                                                                     |
| 10   | »       | N               | M                    | 19 44,0  |   |       |          |                                                                     |
|      |         | E               | M                    | 19 20,5  |   |       |          |                                                                     |
| 11   | Febrero | N               | M                    | 19 5,5   |   |       |          |                                                                     |
|      |         | E               | M                    | 18 58,0  |   |       |          |                                                                     |
| 12   | »       | Z-E             | P                    | 2 0 11   |   |       | 2.960    | Compresión.                                                         |
|      |         | E               | e S                  | 2 4 51   |   |       |          |                                                                     |
|      |         | E               | L                    | 2 8,0    |   |       |          |                                                                     |

| Núm. | Fecha   | Com-<br>ponente | Fase | Hora               |    |      | T  | A  | Δ     | Observaciones |
|------|---------|-----------------|------|--------------------|----|------|----|----|-------|---------------|
|      |         |                 |      | h                  | m  | s    |    |    |       |               |
| 13   | Febrero | 7               | Z    | i P                | 18 | 23   | 50 |    |       | Compresión.   |
| 14   | »       | 9               | E    | L                  | 20 | 17,0 |    |    |       |               |
| 15   | »       | 13              | E    | (?)                | 9  | 40   | 37 |    |       |               |
|      |         |                 | E    | L                  | 9  | 53,0 |    |    |       |               |
| 16   | »       | 13              | Z    | e P                | 17 | 34   | 31 |    |       |               |
|      |         |                 | E    | e (?)              | 17 | 35   | 18 |    |       |               |
|      |         |                 | E    | i (S)              | 17 | 44   | 53 |    |       | (9.200)       |
| 17   | »       | 22              | E    | i (P)              | 17 | 30   | 10 |    |       |               |
|      |         |                 | E    | (PR <sub>1</sub> ) | 17 | 33   | 26 |    |       |               |
|      |         |                 | E    | e (S)              | 17 | 41   | 19 |    |       |               |
|      |         |                 | E    | (SR <sub>1</sub> ) | 17 | 47   | 30 |    |       |               |
|      |         |                 | E    | L                  | 18 | 0,0  |    |    |       |               |
|      |         |                 | E    | M <sub>1</sub>     | 18 | 6,5  | 18 | 89 |       |               |
| 18   | »       | 25              | Z-E  | i P                | 2  | 56   | 47 |    |       |               |
|      |         |                 | E    | i S                | 3  | 1    | 2  |    |       |               |
|      |         |                 | E    | M                  | 3  | 2,0  | 8  | 42 | 2.600 |               |

El Director,

*Leon Herrera*

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

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

$a = 28^m$

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

|                    |         | Registro    | Com-<br>ponente | M          | $T_0$   | V    | $\epsilon$ | $\frac{r}{T_0^2}$ | Extensión<br>de 1 <sup>m</sup><br>en el registro |
|--------------------|---------|-------------|-----------------|------------|---------|------|------------|-------------------|--------------------------------------------------|
| Péndulo horizontal | Bifilar | Mecánico    | E—W             | kg<br>1100 | s<br>20 | 200  | 0          | 0,005             | mm<br>15                                         |
| Idem idem          | Alfani  | Fotográfico | N—S             | 3          | 8       | 1150 | $\infty$   | *                 | 17                                               |
| Idem idem          | idem    | Idem        | E—W             | 3          | 8       | 450  | $\infty$   | *                 | 17                                               |
| Idem zenital       | idem    | Idem        | Z               | 3          | 3       | 600  | 1,81       | *                 | 17                                               |
| Idem vertical      |         | Mecánico    | E—W             | 700        | 2       | 270  | 0          | 0,060             | 15                                               |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Núm. | Fecha | Com-<br>ponente | Fase                                           | Hora     | T  | A     | $\Delta$ | Observaciones                                                                     |
|------|-------|-----------------|------------------------------------------------|----------|----|-------|----------|-----------------------------------------------------------------------------------|
|      |       |                 |                                                | h m s    | s  | $\mu$ | km       |                                                                                   |
| 19   | Marzo | E               | e (PR <sub>1</sub> )                           | 10 30 19 |    |       | (9.200)  |                                                                                   |
|      |       | E               | e (S)                                          | 10 37 19 |    |       |          |                                                                                   |
|      |       | N-E             | e (SR <sub>1</sub> )                           | 10 42 14 |    |       |          |                                                                                   |
|      |       | E               | L                                              | 10 53,0  |    |       |          |                                                                                   |
| 20   | >     | N-E             | (S)                                            | 22 36 20 |    |       |          |                                                                                   |
|      |       | N-E             | L                                              | 22 58,0  |    |       |          |                                                                                   |
| 21   | >     | E               | L                                              | 13 58,0  |    |       |          |                                                                                   |
| 22   | >     | N-E             | P                                              | 17 56 42 |    |       |          |                                                                                   |
|      |       | N-E             | (?)                                            | 17 57 15 |    |       |          |                                                                                   |
| 23   | >     | E               | i P                                            | 17 2 44  |    |       | 230      | A las 17 <sup>h</sup> 3 <sup>m</sup> 36 <sup>s</sup> saltó la pluma del vertical. |
|      |       | N-E             | i S                                            | 17 3 7   |    |       |          |                                                                                   |
| 24   | >     | N               | e (P)                                          | 8 47 5   |    |       | (1.900)  |                                                                                   |
|      |       | N-E             | e (S)                                          | 8 50 25  |    |       |          |                                                                                   |
|      |       | N-E             | L                                              | 8 51,5   |    |       |          |                                                                                   |
| 25   | >     | E               | e (P)                                          | 7 33 30  |    |       | (800)    |                                                                                   |
|      |       | N-E             | S                                              | 7 34 47  |    |       |          |                                                                                   |
| 26   | >     | Z-N             | i P <sub>1</sub>                               | 23 17 10 |    |       | 17.000   | Dilatación.                                                                       |
|      |       | N-E             | P <sub>2</sub>                                 | 23 17 30 |    |       |          |                                                                                   |
|      |       | E               | PR <sub>1</sub>                                | 23 20 58 |    |       |          |                                                                                   |
|      |       | N-E             | (S <sub>c</sub> P <sub>c</sub> S)              | 23 24 13 |    |       |          |                                                                                   |
|      |       | N-E             | PPS                                            | 23 34 24 |    |       |          |                                                                                   |
|      |       | N-E             | SR <sub>1</sub>                                | 23 40 25 |    |       |          |                                                                                   |
| 27   | >     | N-E             | SR <sub>2</sub>                                | 23 46 23 |    |       | (19.000) |                                                                                   |
|      |       | N-E             | L                                              | 24 12,0  |    |       |          |                                                                                   |
|      |       | Z               | e (P <sub>1</sub> )                            | 12 44 29 |    |       |          |                                                                                   |
|      |       | Z               | e (PR <sub>1</sub> )                           | 12 49 35 |    |       |          |                                                                                   |
| 28   | >     | N-E             | S <sub>c</sub> P <sub>c</sub> P <sub>c</sub> S | 12 56 38 |    |       | 16 13    |                                                                                   |
|      |       | N-E             | L                                              | 13 52,0  |    |       |          |                                                                                   |
|      |       | N-E             | L                                              | 22 12,0  |    |       |          |                                                                                   |
| 29   | >     | M               | M                                              | 22 28,0  | 16 | 13    | 2.300    |                                                                                   |
|      |       | E               | M                                              | 22 27,0  | 18 | 22    |          |                                                                                   |
|      |       | N-E-Z           | e P                                            | 3 26 9   |    |       |          |                                                                                   |
| 30   | Abril | N-E             | i S                                            | 3 30 0   |    |       |          |                                                                                   |
|      |       | N-E             | i (SR <sub>1</sub> )                           | 3 30 40  |    |       |          |                                                                                   |
|      |       | N-E             | L                                              | 3 34,0   |    |       |          |                                                                                   |
|      |       | N               | M                                              | 3 35,5   | 14 | 10    |          |                                                                                   |
|      |       | E               | M                                              | 3 35,5   | 12 | 13    |          |                                                                                   |
| 31   | >     | N-E             | L                                              | 3 50,0   |    |       | (17.000) |                                                                                   |
|      |       | Z               | e (P <sub>1</sub> )                            | 11 21 42 |    |       |          |                                                                                   |
|      |       | E               | e (P <sub>2</sub> )                            | 11 22 33 |    |       |          |                                                                                   |
|      |       | E               | i (PR)                                         | 11 29 41 |    |       |          |                                                                                   |
|      |       | E               | (S <sub>c</sub> P <sub>c</sub> S)              | 11 37 2  |    |       |          |                                                                                   |
| 32   | >     | L               | L                                              | 12 16,0  |    |       |          |                                                                                   |
|      |       | E-Z             | P                                              | 23 23 26 |    |       |          |                                                                                   |
|      |       | N-E             | S                                              | 23 30 18 |    |       |          |                                                                                   |
|      |       | N-E             | L                                              | 23 38,0  |    |       |          |                                                                                   |
|      |       | N               | M                                              | 23 44,5  | 22 | 26    |          |                                                                                   |
| 33   | >     | E               | M                                              | 23 49,5  | 19 | 31    | 5.200    |                                                                                   |
|      |       | E               | L                                              | 6 2,5    |    |       |          |                                                                                   |

| Núm. | Fecha    | Com-<br>ponente | Fase                              | Hora                | T        | A         | $\Delta$ | Observaciones                                                                            |
|------|----------|-----------------|-----------------------------------|---------------------|----------|-----------|----------|------------------------------------------------------------------------------------------|
| 34   | Abril 19 | N-E-Z           | i P                               | h m s               | s        | lt        | km       | Dilatación.<br>A las 15 <sup>h</sup> 31 <sup>m</sup> ,5 saltó la pluma del bi-<br>filar. |
|      |          | E               | S                                 | 15 27 39            |          |           |          |                                                                                          |
|      |          | E               | L                                 | 15 30 31<br>15 31,5 |          |           |          |                                                                                          |
| 35   | » 19     | Z               | P                                 | 16 22 56            |          |           | 1.600    | En los demás, confundido con el an-<br>terior.                                           |
| 36   | » 19     | N-E-Z           | i P                               | 18 2 6              |          |           | 2.000    | Dilatación.                                                                              |
|      |          | N-E             | S                                 | 18 5 27             |          |           |          |                                                                                          |
| 37   | » 19     | Z               | P                                 | 20 35 56            |          |           | 2.000    |                                                                                          |
|      |          | N-E-Z           | i (?)                             | 20 36 6             |          |           |          |                                                                                          |
|      |          | N-E             | S                                 | 20 39 26            |          |           |          |                                                                                          |
| 38   | » 20     | N-E-Z           | i P                               | 5 15 13             |          |           | 2.000    | Dilatación.                                                                              |
|      |          | N               | i S                               | 5 18 45             |          |           |          |                                                                                          |
| 39   | » 20     | N-E             | (S <sub>c</sub> P <sub>c</sub> S) | 22 26 39            | 21<br>19 | 44<br>172 | (11.200) |                                                                                          |
|      |          | E               | (SR <sub>1</sub> )                | 22 34 12            |          |           |          |                                                                                          |
|      |          | N-E             | L                                 | 22 54,5             |          |           |          |                                                                                          |
|      |          | N               | M                                 | 23 0,0              |          |           |          |                                                                                          |
|      |          | E               | M                                 | 23 0,0              |          |           |          |                                                                                          |
| 40   | » 23     | N-E             | e P                               | 2 17 9              |          |           |          |                                                                                          |
| 41   | » 23     | N-E             | e (P)                             | 17 8 15             |          |           | (600)    |                                                                                          |
|      |          | E               | S                                 | 17 9 15             |          |           |          |                                                                                          |
| 42   | » 24     | E-Z             | P                                 | 16 4 47             |          |           | (9.800)  | Compresión.                                                                              |
|      |          | N               | e (S)                             | 16 15 18            |          |           |          |                                                                                          |
|      |          | E               | e (S)                             | 16 15 35            |          |           |          |                                                                                          |
|      |          | N-E             | L                                 | 16 37,0             |          |           |          |                                                                                          |
| 43   | » 25     | N-E             | L                                 | 1 16,0              |          |           |          |                                                                                          |

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

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

| | | Registro | Com- ponente | M | T ₀ | V | ε | $\frac{r}{T_0^2}$ | Extensión de 1 ^m en el registro |
|--------------------|---------|-------------|-----------------|------|----------------|------|---------------|-------------------|--|
| | | | | kg | s | | | | mm |
| Péndulo horizontal | Bifilar | Mecánico | E—W | 1100 | 20 | 200 | 0 | 0,005 | 15 |
| Idem idem | Alfani | Fotográfico | N—S | 3 | 8 | 1150 | ∞ | > | 17 |
| Idem idem | idem | Idem | E—W | 3 | 8 | 450 | ∞ | > | 17 |
| Idem zenital | idem | Idem | Z | 3 | 3 | 600 | 1,81 | > | 17 |
| Idem vertical | | Mecánico | E—W | 700 | 2 | 270 | 0 | 0,060 | 15 |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL
(GREENWICH)

| Núm. | Fecha | Com- ponente | Fase | Hora | | | T | A | Δ | Observaciones | |
|------|---------|-----------------|-----------------------------------|------|------|----|---|---|----------|---------------|----|
| | | | | h | m | s | | | | | |
| 44 | Mayo 1 | Z | e (P) | 10 | 32 | 54 | | | (3.400) | | |
| | | N-E | (PR ₁) | 10 | 34 | 13 | | | | | |
| | | N-E | i S | 10 | 38 | 5 | | | | | |
| | | N | L | 10 | 42,0 | | | | | | |
| 45 | > 4-5 | N-E | L | 0 | 0,0 | | | | | | |
| 46 | > 7 | N-E | L | 7 | 0,0 | | | | | | |
| 47 | > 12 | N-E | L | 21 | 9,5 | | | | | | |
| 48 | > 13 | Z | e (P ¹) | 20 | 6 | 31 | | | (13.400) | | |
| | | N-E | (PS) | 20 | 17 | 46 | | | | | |
| | | N-E | L | 20 | 46,0 | | | | | | |
| 49 | > 14 | N-E | L | 1 | 10,5 | | | | | | |
| 50 | > 14-15 | N-E | e P | 23 | 36 | 29 | | | 9.300 | Compresión. | |
| | | Z | i P | 23 | 36 | 31 | | | | | |
| | | N-E | i S | 23 | 46 | 55 | | | | | |
| | | E | i | 23 | 47 | 3 | | | | | |
| | | E | i PS | 23 | 47 | 55 | | | | | |
| | | N | SR ₂ | 23 | 54 | 26 | | | | | |
| N-E | L | 0 | 6,0 | | | | | | | | |
| N | M | 0 | 17,0 | 18 | 36 | | | | | | |
| E | M | 0 | 17,0 | 18 | 29 | | | | | | |
| 51 | > 15 | E | e (PR) | 2 | 20 | 5 | | | | | |
| | | N | e (PR) | 2 | 20 | 12 | | | | | |
| | | N-E | L | 2 | 42,5 | | | | | | |
| 52 | > 16 | N-E | L | 18 | 2,0 | | | | | | |
| 53 | > 16 | N-E | L | 21 | 53,0 | | | | | | |
| 54 | > 20 | N-E | L | 6 | 31,0 | | | | | | |
| 55 | > 21 | E | e (PR ₁) | 7 | 14 | 10 | | | (19.000) | | |
| | | N | e (SR ₂) | 7 | 42 | 4 | | | | | |
| | | N-E | L | 8 | 8,0 | | | | | | |
| 56 | > 23 | E | e (S) | 18 | 8 | 17 | | | (4.500) | | |
| | | E | e (SR) | 18 | 11 | 45 | | | | | |
| | | N-E | L | 18 | 15,5 | | | | | | |
| | | N | M | 18 | 18,0 | 18 | | | | | 7 |
| | | N | M | 18 | 21,5 | 18 | | | | | 7 |
| E | M | 18 | 22,0 | 18 | 14 | | | | | | |
| 57 | > 24 | N-E | e (PR ₁) | 5 | 56 | 15 | | | (13.500) | | |
| | | E | (S _c P _c P) | 5 | 57 | 56 | | | | | |
| | | E | (S _c P _c S) | 6 | 1 | 51 | | | | | |
| | | N-E | i (PS) | 6 | 5 | 56 | | | | | |
| | | N | (PPS) | 6 | 7 | 25 | | | | | |
| | | E | e (SR ₁) | 6 | 12 | 34 | | | | | |
| | | N | (SR ₂) | 6 | 17 | 0 | | | | | |
| | | N-E | L | 6 | 32,0 | | | | | | |
| | | N | M | 6 | 53,0 | 18 | | | | | 17 |
| | | E | M | 6 | 53,5 | 15 | | | | | 25 |
| | | N | M | 6 | 55,0 | 18 | | | | | 18 |
| | | E | M | 6 | 58,0 | 15 | | | | | 21 |
| E | M | 7 | 0,0 | 17 | 25 | | | | | | |
| E | M | 7 | 2,0 | 17 | 24 | | | | | | |
| N | M | 7 | 2,5 | 18 | 14 | | | | | | |
| N | M | 7 | 5,5 | 18 | 16 | | | | | | |
| N | M | 7 | 8,0 | 18 | 18 | | | | | | |

| Núm. | Fecha | Com- ponente | Fase | Hora | | | T s | A μ | Δ km | Observaciones | |
|------|-------|-----------------|-------|----------------------|----|------|--------|--------|----------|---------------|---|
| | | | | h | m | s | | | | | |
| 58 | Mayo | 25 | N | e (PR ₁) | 0 | 41 | 18 | | | | |
| | | | E | e (PR ₁) | 0 | 41 | 21 | | | | |
| | | | N-E | e (PR ₂) | 0 | 43 | 22 | | | | |
| | | | N-E | e (ScPcS) | 0 | 47 | 18 | | | | |
| | | | N-E | L | 1 | 11,5 | | | (11.200) | | |
| 59 | > | 26 | N-E | L | 23 | 6,0 | | | | | |
| 60 | > | 27 | N-E | L | 4 | 40,0 | | | | | |
| 61 | > | 28 | N-E | L | 17 | 53,5 | | | | | |
| | | | | | | | | | | | |
| 62 | > | 30 | Z | i P | 21 | 43 | 1 | 26 | 250 | | Dilatación. A las 22 ^h 15 ^m saltó la pluma del bi- filar. |
| | | | N | (PP) | 21 | 43 | 31 | | | | |
| | | | E | i PR ₂ | 21 | 46 | 23 | | | | |
| | | | E | i S | 21 | 51 | 36 | | | | |
| | | | E | i SR ₁ | 21 | 56 | 5 | | | | |
| | | | E | i RS ₂ | 21 | 58 | 0 | | | | |
| | | | N-E | L | 22 | 2,0 | | | | | |
| | | | N | M | 22 | 5,0 | | | | | |
| | | | N | M | 22 | 12,5 | 22,5 | | | | |
| | | | N | M | 22 | 19,0 | 13 | | | | |
| E | M | 22 | 16,5 | 18 | | | | | | | |
| E | M | 22 | 26,5 | 18 | | | | | | | |
| N | M | 22 | 29,0 | 17 | | | | | | | |
| | | | | | | | | | 7.000 | | |
| 63 | > | 31 | N-E | e (?) | 8 | 41 | 12 | | | | |
| 64 | Junio | 2 | Z | P | 9 | 26 | 33 | | | | |
| | | | N | e S | 9 | 34 | 53 | | | | |
| | | | E | i (?) | 9 | 35 | 5 | | | | |
| | | | N-E | L | 9 | 51,0 | | | | | |
| | | | | | | | | | | | 7.000 |
| 65 | > | 18 | N | e | 23 | 3 | 7 | | | | |
| | | | N-E | L | 23 | 31,0 | | | | | |
| 66 | > | 19 | N-E | L | 23 | 41,0 | | | | | |
| 67 | > | 22 | N-E | L | 16 | 52,5 | | | | | |
| | | | | | | | | | | | |
| | > | 24-25 | Z | i P' ₁ | 23 | 42 | 59 | | | | Compresión. |
| | | | N-E | i | 23 | 43 | 3 | | | | |
| | | | N-E | i | 23 | 43 | 40 | | | | |
| 68 | | | N-E | PR ₁ | 23 | 47 | 25 | | | | |
| | | | N | PR ₂ | 23 | 51 | 17 | | | | |
| | | | E | PcScPcS | 0 | 1 | 0 | | | | |
| | | | N-E | SR ₂ | 0 | 14 | 38 | | | | |
| | | | N-E | L | 0 | 40,0 | | | | | |
| | | | E | M | 0 | 43,5 | 21,5 | | | | |
| | | | N | M | 0 | 49,0 | 22,0 | | | | |
| | | | E | M | 0 | 54,0 | 21,0 | | | | |
| N | M | 0 | 54,5 | 22,0 | | | | | | | |
| | | | | | | | | | | 18.000 | |
| 69 | > | 25 | E | L | 13 | 27,0 | | | | | Perdido en el cambio en los fotográ- ficos. |
| 70 | > | 27 | N-E | e P | 17 | 23 | 28 | | | | |
| | | | N-E | e (?) | 17 | 28 | 55 | | | | |
| | | | N-E | L | 17 | 31,0 | | | | | |
| 71 | > | 28 | N-E | e (?) | 2 | 26 | 22 | | | | |
| | | | N-E | L | 2 | 53,0 | | | | | |
| 72 | > | 29 | Z-N-E | i P | 7 | 1 | 32 | | | | |
| | | | E | i S | 7 | 12 | 6 | | | | |
| | | | N | i | 7 | 12 | 20 | | | | |
| | | | N-E | L | 7 | 31,0 | | | | | |
| | | | N | M | 7 | 43,0 | 17,5 | | | | |
| | | | E | M | 7 | 43,0 | 17,5 | | | | |
| N | M | 7 | 45,5 | 17,0 | | | | | | | |
| N | M | 7 | 47,0 | 17,0 | | | | | | | |
| | | | | | | | | | | 9.250 | |

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

|                    |         | Registro    | Com-<br>ponente | M          | $T_0$   | V    | $\epsilon$ | $\frac{r}{T_0^2}$ | Extensión<br>de 1 <sup>m</sup><br>en el registro |
|--------------------|---------|-------------|-----------------|------------|---------|------|------------|-------------------|--------------------------------------------------|
| Péndulo horizontal | Bifilar | Mecánico    | E—W             | kg<br>1100 | s<br>20 | 200  | 0          | 0,005             | mm<br>15                                         |
| Idem idem          | Alfani  | Fotográfico | N—S             | 3          | 8       | 1150 | $\infty$   | »                 | 17                                               |
| Idem idem          | idem    | Idem        | E—W             | 3          | 8       | 450  | $\infty$   | »                 | 17                                               |
| Idem zenital       | idem    | Idem        | Z               | 3          | 3       | 600  | 1,81       | »                 | 17                                               |
| Idem vertical      |         | Mecánico    | E—W             | 700        | 2       | 270  | 0          | 0,060             | 15                                               |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Núm. | Fecha | Com-<br>ponente | Fase                 | Hora     | T  | A     | $\Delta$ | Observaciones         |
|------|-------|-----------------|----------------------|----------|----|-------|----------|-----------------------|
| 73   | Julio | Z               | i P                  | h m s    | s  | $\mu$ | km       | Compresión.           |
|      |       | N-E             | i S                  | 18 2 55  |    |       |          |                       |
|      |       | N-E             | L                    | 18 10 44 |    |       |          |                       |
|      |       | E               | M                    | 18 23,0  |    |       |          |                       |
|      |       | N               | M                    | 18 31,0  |    |       |          |                       |
| 74   | »     | E               | e (?)                | 18 32,5  | 17 | 14    | 6.165    |                       |
|      |       |                 | e (?)                | 13 41 43 |    |       |          |                       |
|      |       |                 | L                    | 13 48 11 |    |       |          |                       |
| 75   | »     | Z               | e P                  | 14 21,5  | 17 | 9     | (9.600)  |                       |
|      |       |                 | e (?)                | 6 55 36  |    |       |          |                       |
|      |       |                 | L                    | 7 4 26   |    |       |          |                       |
| 76   | »     | N-E             | L                    | 7 33,5   | 15 | 8     | (10.000) |                       |
|      |       |                 | e (P)                | 12 34 21 |    |       |          |                       |
|      |       |                 | (S)                  | 12 45 2  |    |       |          |                       |
| 77   | »     | E               | e (PR <sub>1</sub> ) | 13 6,0   | 18 | 19    | (10.600) |                       |
|      |       |                 | e (PR <sub>2</sub> ) | 8 52 9   |    |       |          |                       |
|      |       |                 | e (S)                | 8 54 0   |    |       |          |                       |
|      |       |                 | e (?)                | 9 1 13   |    |       |          |                       |
|      |       |                 | e (SR <sub>2</sub> ) | 9 1 20   |    |       |          |                       |
| 78   | »     | N-E             | L                    | 9 11 23  | 18 | 19    | (10.600) |                       |
|      |       |                 | L                    | 9 17,5   |    |       |          |                       |
|      |       |                 | L                    | 2 20,5   |    |       |          |                       |
| 79   | »     | N               | L                    | 18 31,0  | 15 | 8     | (10.600) |                       |
|      |       |                 | L                    | 17 14,0  |    |       |          |                       |
| 80   | »     | N               | M                    | 17 25,5  | 15 | 9     | (10.600) |                       |
|      |       |                 | M                    | 17 25,5  |    |       |          |                       |
| 81   | »     | N-E             | i (SR)               | 4 44 58  | 15 | 9     | (10.600) |                       |
|      |       |                 | M                    | 4 57,0   |    |       |          |                       |
|      |       |                 | (S)                  | 11 10 24 |    |       |          |                       |
|      |       |                 | (PS)                 | 11 11 23 |    |       |          |                       |
|      |       |                 | L                    | 11 30,0  |    |       |          |                       |
| 82   | »     | E               | M                    | 11 39,5  | 18 | 19    | (10.600) |                       |
|      |       |                 | M                    | 11 40,0  |    |       |          |                       |
|      |       |                 | e (PR <sub>2</sub> ) | 1 7 54   |    |       |          |                       |
|      |       |                 | e (S)                | 1 13 36  |    |       |          |                       |
|      |       |                 | e (PS)               | 1 14 23  |    |       |          |                       |
|      |       |                 | (SR <sub>1</sub> )   | 1 21 41  |    |       |          |                       |
|      |       |                 | (SR <sub>2</sub> )   | 1 25 50  |    |       |          |                       |
|      |       |                 | L                    | 1 36,0   |    |       |          |                       |
|      |       |                 | M                    | 1 44,5   |    |       |          |                       |
|      |       |                 | M                    | 1 48,0   |    |       |          |                       |
| 83   | »     | N-E             | M                    | 1 54,0   | 18 | 22    | (10.600) |                       |
|      |       |                 | M                    | 1 54,0   |    |       |          |                       |
|      |       |                 | M                    | 1 57,0   |    |       |          |                       |
|      |       |                 | M                    | 1 57,0   |    |       |          |                       |
|      |       |                 | M                    | 1 58,5   |    |       |          |                       |
| 84   | »     | E               | e (S)                | 10 45 9  | 18 | 28    | (10.600) | Perdido en el cambio. |
|      |       |                 | L                    | 5 20,0   |    |       |          |                       |
| 85   | »     | N-E             | (S)                  | 8 25 47  | 18 | 28    | (10.600) |                       |
|      |       |                 | L                    | 5 20,0   |    |       |          |                       |
| 86   | »     | N-E             | (S)                  | 8 25 47  | 18 | 28    | (10.600) |                       |
|      |       |                 | L                    | 5 20,0   |    |       |          |                       |
|      |       |                 | L                    | 5 20,0   |    |       |          |                       |
| 87   | »     | E               | e (PR <sub>1</sub> ) | 11 0 26  | 18 | 28    | (10.600) |                       |
|      |       |                 | e (SR <sub>2</sub> ) | 11 11 37 |    |       |          |                       |
|      |       |                 | L                    | 11 15,0  |    |       |          |                       |

| Núm. | Fecha  | Componente | Fase  | Hora                 | T        | A | $\Delta$ | Observaciones |             |    |    |
|------|--------|------------|-------|----------------------|----------|---|----------|---------------|-------------|----|----|
| 88   | Julio  | 29         | Z-N-E | i P                  | h m s    | s | $\mu$    | km            | Dilatación. |    |    |
|      |        |            | N-E   | i (PR <sub>2</sub> ) | 7 58 1   |   |          |               |             |    |    |
|      |        |            | E     | (SR <sub>1</sub> )   | 8 2 48   |   |          |               |             |    |    |
|      |        |            | E     | (SR <sub>2</sub> )   | 8 13 6   |   |          |               |             |    |    |
|      |        |            | E     | M                    | 8 16 27  |   |          |               |             |    |    |
|      |        |            | E     | M                    | 8 27,5   |   |          |               |             | 15 | 28 |
|      |        |            | E     | M                    | 8 28,0   |   |          |               |             | 18 | 40 |
|      |        |            | N     | M                    | 8 31,5   |   |          |               |             | 29 | 47 |
| 89   | »      | 29         | N-E   | L                    | 23 52,0  |   |          | (8.700)       |             |    |    |
|      |        |            | N     | L                    | 6 51,0   |   |          |               |             |    |    |
| 91   | Agosto | 1          | N-E   | e (PR <sub>1</sub> ) | 14 26 10 |   |          | (13.000)      |             |    |    |
|      |        |            | N     | e (S)                | 14 35 16 |   |          |               |             |    |    |
|      |        |            | E     | e (PS)               | 14 36 8  |   |          |               |             |    |    |
|      |        |            | N-E   | L                    | 15 6,0   |   |          |               |             |    |    |
| 92   | »      | 1          | N     | e (P)                | 16 20 19 |   |          | (7.900)       |             |    |    |
|      |        |            | N-E   | e (S)                | 16 29 38 |   |          |               |             |    |    |
|      |        |            | N-E   | L                    | 16 41,0  |   |          |               |             |    |    |
| 93   | »      | 2          | Z-N-E | e (P)                | 18 26 5  |   |          | (200)         |             |    |    |
|      |        |            | Z-N   | e (S)                | 18 26 26 |   |          |               |             |    |    |
| 94   | »      | 3          | E     | e P                  | 1 23 39  |   |          | (9.700)       |             |    |    |
|      |        |            | E     | (PR <sub>1</sub> )   | 1 27 33  |   |          |               |             |    |    |
|      |        |            | E     | (PR <sub>2</sub> )   | 1 29 23  |   |          |               |             |    |    |
|      |        |            | N-E   | (S)                  | 1 34 20  |   |          |               |             |    |    |
|      |        |            | N-E   | i (PS)               | 1 35 18  |   |          |               |             |    |    |
|      |        |            | N-E   | L                    | 1 52,5   |   |          |               |             |    |    |
|      |        |            | N     | M                    | 2 10,0   |   |          |               |             | 21 | 38 |
|      |        |            | E     | M                    | 2 11,0   |   |          |               |             | 22 | 71 |
| 95   | »      | 3          | E     | e (P)                | 5 37 29  |   |          | (4.000)       |             |    |    |
|      |        |            | E     | e (S)                | 5 40 53  |   |          |               |             |    |    |
|      |        |            | N     | i (?)                | 5 41 7   |   |          |               |             |    |    |
|      |        |            | N-E   | L                    | 5 45,0   |   |          |               |             |    |    |
|      |        |            | N-E   | L                    | 12 48,0  |   |          |               |             |    |    |
| 96   | »      | 3          | N-E   | L                    | 3 5,0    |   |          |               |             |    |    |
| 97   | »      | 4          | N-E   | L                    | 0 43,0   |   |          |               |             |    |    |
| 98   | »      | 6          | N-E   | L                    | 14 20,0  |   |          |               |             |    |    |
| 99   | »      | 6          | N-E   | L                    | 17 46,0  |   |          |               |             |    |    |
| 100  | »      | 6          | N-E   | L                    | 9 23 29  |   |          |               |             |    |    |
| 101  | »      | 7          | N     | e (?)                | 9 42,0   |   |          |               |             |    |    |
| 102  | »      | 10         | N-E   | L                    | 18 13,0  |   |          |               |             |    |    |
| 103  | »      | 17         | Z     | P' <sub>1</sub>      | 2 4 41   |   |          | (16.000)      | Compresión. |    |    |
|      |        |            | Z-E   | i                    | 2 4 50   |   |          |               |             |    |    |
|      |        |            | E     | PR <sub>1</sub>      | 2 8 51   |   |          |               |             |    |    |
|      |        |            | E     | PPS                  | 2 20 34  |   |          |               |             |    |    |
|      |        |            | E     | (SR <sub>1</sub> )   | 2 26 45  |   |          |               |             |    |    |
|      |        |            | E     | (SR <sub>2</sub> )   | 2 33 12  |   |          |               |             |    |    |
|      |        |            | E     | L                    | 2 54,0   |   |          |               |             |    |    |
|      |        |            | E     | M                    | 3 14,0   |   |          |               |             | 21 | 55 |
| E    | M      | 3 22,5     | 22    | 60                   |          |   |          |               |             |    |    |
| 104  | »      | 22         | Z-N-E | e P                  | 20 39 36 |   |          | 5.300         |             |    |    |
|      |        |            | N-E   | S                    | 20 46 36 |   |          |               |             |    |    |
|      |        |            | N     | (PS)                 | 20 47 29 |   |          |               |             |    |    |
|      |        |            | N-E   | L                    | 20 53,5  |   |          |               |             |    |    |
| 105  | »      | 23         | N-E   | L                    | 15 1,0   |   |          |               |             |    |    |
| 106  | »      | 25         | N-E   | L                    | 5 26,0   |   |          |               |             |    |    |
| 107  | »      | 26         | N     | L                    | 17 29,0  |   |          |               |             |    |    |
| 108  | »      | 31         | N-E   | L                    | 18 32,5  |   |          |               |             |    |    |

El Director,

*Leon 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

|                    |         | Registro    | Com-<br>ponente | M         | T <sub>0</sub> | V    | $\varepsilon$ | $\frac{r}{T_0^2}$ | Extensión<br>de 1 <sup>m</sup><br>en el registro |
|--------------------|---------|-------------|-----------------|-----------|----------------|------|---------------|-------------------|--------------------------------------------------|
| Péndulo horizontal | Bifilar | Mecánico    | N—S             | kg<br>700 | s<br>15        | 150  | 0             | 0,006             | mm<br>15                                         |
| Idem idem          | idem    | Idem        | E—W             | 1100      | 20             | 200  | 0             | 0,008             | 15                                               |
| Idem idem          | Alfani  | Fotográfico | N—S             | 3         | 8              | 1000 | $\infty$      | $\gg$             | 17                                               |
| Idem idem          | idem    | Idem        | E—W             | 3         | 8              | 465  | $\infty$      | $\gg$             | 17                                               |
| Idem zenital       | idem    | Idem        | Z               | 3         | 5              | 600  | 1,81          | $\gg$             | 17                                               |
| Idem vertical      |         | Mecánico    | E—W             | 700       | 2              | 270  | 0             | 0,060             | 15                                               |

## TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL (GREENWICH)

| Núm. | Fecha                               | Com-<br>ponente | Fase                 | Hora                            | T        | A     | $\Delta$ | Observaciones          |  |  |
|------|-------------------------------------|-----------------|----------------------|---------------------------------|----------|-------|----------|------------------------|--|--|
|      |                                     |                 |                      | h m s                           | s        | $\mu$ | km       |                        |  |  |
| 109  | Septiembre 3                        | E               | e (PR <sub>1</sub> ) | 17 40 17                        |          |       |          |                        |  |  |
|      |                                     | N-E             | e (S)                | 17 44 55                        |          |       | (4.000)  |                        |  |  |
|      |                                     | N-E             | L                    | 17 50,0                         |          |       |          |                        |  |  |
| 110  | >                                   | 4               | E                    | e (P)                           | 1 40 13  |       |          | Confundido con el 111. |  |  |
| 111  | >                                   | 4               | N-E                  | e (P)                           | 1 49 18  |       |          |                        |  |  |
|      |                                     |                 | E                    | (PR <sub>1</sub> )              | 1 55 56  |       |          |                        |  |  |
|      |                                     |                 | N                    | (PR <sub>2</sub> )              | 1 58 25  |       |          |                        |  |  |
|      |                                     |                 | N-E                  | (S)                             | 2 2 22   |       |          |                        |  |  |
|      |                                     |                 | E                    | i (SR)                          | 2 5 17   |       |          |                        |  |  |
|      |                                     |                 | N-E                  | L                               | 2 29,0   |       |          |                        |  |  |
|      |                                     |                 | N                    | M                               | 2 36,5   | 19    | 29       |                        |  |  |
| 112  | >                                   | 4               | E                    | M                               | 2 36,5   | 18,5  | 59       |                        |  |  |
|      |                                     |                 | N                    | M                               | 2 46,5   | 16,8  | 41       |                        |  |  |
|      |                                     |                 | E                    | M                               | 2 46,5   | 15,8  | 44       | >12.000                |  |  |
|      |                                     |                 | N-E                  | L                               | 4 25,0   |       |          |                        |  |  |
|      |                                     |                 | 113                  | >                               | 6        | N     | L        | 20 30,0                |  |  |
|      |                                     |                 | 114                  | >                               | 9        | N-E   | L        | 3 2,0                  |  |  |
|      |                                     |                 | 115                  | >                               | 9        | N     | e (P)    | 6 33 18                |  |  |
| N-E  | e (PR <sub>1</sub> )                | 6 38 43         |                      |                                 |          |       |          |                        |  |  |
| N-E  | e (S <sub>c</sub> P <sub>c</sub> S) | 6 44 25         |                      |                                 |          |       |          |                        |  |  |
| N    | e (S)                               | 6 46 50         |                      |                                 |          |       |          |                        |  |  |
| E    | e (PS)                              | 6 48 12         |                      |                                 |          |       |          |                        |  |  |
| N    | e (SR <sub>1</sub> )                | 6 55 59         |                      |                                 |          |       |          |                        |  |  |
| N-E  | L                                   | 7 14,0          |                      |                                 |          |       |          |                        |  |  |
| 116  | >                                   | 11              | E                    | M                               | 7 22,5   | 32    | 123      |                        |  |  |
|      |                                     |                 | E                    | M                               | 7 24,5   | 24    | 65       | (13.200)               |  |  |
|      |                                     |                 | N                    | M                               | 7 24,5   | 23    | 35       |                        |  |  |
|      |                                     |                 | 117                  | >                               | 11       | E     | L        | 13 21,0                |  |  |
| 117  | >                                   | 11              | Z-N-E                | P                               | 14 17 28 |       |          | Compresión.            |  |  |
|      |                                     |                 | N                    | (PR <sub>1</sub> )              | 14 21 26 |       |          |                        |  |  |
|      |                                     |                 | N-E                  | S <sub>c</sub> P <sub>c</sub> S | 14 28 10 |       |          |                        |  |  |
|      |                                     |                 | N-E                  | PS                              | 14 30 17 |       |          |                        |  |  |
|      |                                     |                 | N                    | SR <sub>1</sub>                 | 14 35 36 |       |          |                        |  |  |
| 118  | >                                   | 15              | N-E                  | L                               | 14 54,5  |       | 11.200   |                        |  |  |
|      |                                     |                 | E                    | L                               | 12 36,0  |       |          |                        |  |  |
| 119  | >                                   | 18              | E                    | L                               | 5 35,0   |       |          |                        |  |  |
| 120  | >                                   | 18              | E                    | L                               | 9 16,0   |       |          |                        |  |  |
| 121  | >                                   | 18              | N-E                  | L                               | 21 7,5   |       |          |                        |  |  |
| 122  | >                                   | 19              | E                    | i S                             | 3 20 29  |       |          |                        |  |  |
|      |                                     |                 | E                    | L                               | 3 47,0   |       |          |                        |  |  |
| 123  | >                                   | 20              | N                    | P                               | 2 6 12   |       |          |                        |  |  |
|      |                                     |                 | N-E                  | i P'                            | 2 9 51   |       |          |                        |  |  |
|      |                                     |                 | N-E                  | i SR <sub>1</sub>               | 2 27 1   |       |          |                        |  |  |
|      |                                     |                 | N-E                  | L                               | 2 50,0   |       |          |                        |  |  |
|      |                                     |                 | N                    | M                               | 2 55,0   | 30    | 211      |                        |  |  |
|      |                                     |                 | E                    | M                               | 2 55,0   | 30    | 388      |                        |  |  |
|      |                                     |                 | E                    | M                               | 2 58,5   | 26    | 335      |                        |  |  |
| 123  | >                                   | 20              | N                    | M                               | 3 5,5    | 24    | 280      |                        |  |  |
|      |                                     |                 | E                    | M                               | 3 7,5    | 23    | 251      |                        |  |  |
|      |                                     |                 | N                    | M                               | 3 15,0   | 20    | 155      |                        |  |  |
|      |                                     |                 | N                    | M                               | 3 30,0   | 19    | 157      | 13.000                 |  |  |
|      |                                     |                 |                      |                                 |          |       |          |                        |  |  |

A 3<sup>h</sup> 34<sup>m</sup> saltó la pluma del bifilar de 700 kilogramos.

| Núm. | Fecha         | Componente | Fase                                | Hora     | T  | A   | Δ        | Observaciones                                                                  |
|------|---------------|------------|-------------------------------------|----------|----|-----|----------|--------------------------------------------------------------------------------|
|      |               |            |                                     | h m s    | s  | μ   | km       |                                                                                |
| 124  | Septiembre 20 | N-E        | P                                   | 5 46 5   |    |     |          |                                                                                |
|      |               | N-E        | PR <sub>1</sub>                     | 5 50 54  |    |     |          |                                                                                |
|      |               | N          | S <sub>c</sub> P <sub>c</sub> S     | 5 56 16  |    |     |          |                                                                                |
|      |               | E          | i SR <sub>1</sub>                   | 6 6 24   |    |     |          |                                                                                |
|      |               | N-E        | L                                   | 6 30,0   |    |     |          |                                                                                |
|      |               | E          | M                                   | 6 34,5   | 25 | 81  |          |                                                                                |
| 125  | » 20          | N          | M                                   | 6 46,5   | 21 | 38  | 13.000   |                                                                                |
|      |               | E          | M                                   | 6 58,5   | 21 | 39  |          |                                                                                |
|      |               | N-E        | L                                   | 22 15,0  |    |     |          |                                                                                |
| 126  | » 23          | Z-E        | (P)                                 | 9 37 42  |    |     |          |                                                                                |
|      |               | N-E        | i (P')                              | 9 41 14  |    |     |          |                                                                                |
|      |               | E          | e (PR <sub>1</sub> )                | 9 43 23  |    |     |          |                                                                                |
|      |               | N          | e (S <sub>c</sub> P <sub>c</sub> S) | 9 48 21  |    |     |          |                                                                                |
|      |               | N          | e (S)                               | 9 52 11  |    |     |          |                                                                                |
|      |               | N-E        | L                                   | 10 25,0  |    |     |          |                                                                                |
| 127  | » 24          | E          | M                                   | 11 14,0  | 17 | 15  | (15.000) |                                                                                |
|      |               | N          | M                                   | 11 17,0  | 18 | 18  |          |                                                                                |
|      |               | N-E        | L                                   | 6 11,5   |    |     |          |                                                                                |
| 128  | » 24          | N-E        | e P                                 | 22 24 34 |    |     |          |                                                                                |
|      |               | N-E        | S                                   | 22 34 45 |    |     |          |                                                                                |
|      |               | E          | i (?)                               | 22 45 59 |    |     |          |                                                                                |
|      |               | N-E        | L                                   | 22 52,0  |    |     |          |                                                                                |
|      |               | E          | M                                   | 22 57,0  | 20 | 24  |          |                                                                                |
|      |               | N          | M                                   | 22 57,5  | 20 | 18  | 9.000    |                                                                                |
| 129  | » 25          | N          | e (?)                               | 10 34 20 |    |     |          |                                                                                |
|      |               | N          | e (P')                              | 10 39 29 |    |     |          |                                                                                |
|      |               | E          | e (S <sub>c</sub> P <sub>c</sub> P) | 10 42 6  |    |     |          |                                                                                |
|      |               | N          | e (PR <sub>1</sub> )                | 10 42 39 |    |     |          |                                                                                |
|      |               | E          | e (PR <sub>2</sub> )                | 10 45 44 |    |     |          |                                                                                |
|      |               | E          | e (SR <sub>1</sub> )                | 11 0 16  |    |     |          |                                                                                |
| 130  | » 26          | N-E        | L                                   | 11 31,0  |    |     | (16.700) |                                                                                |
|      |               | N-E        | L                                   | 23 54,0  |    |     |          |                                                                                |
|      |               | N-E        | L                                   | 23 54,0  |    |     |          |                                                                                |
| 131  | Octubre 2     | Z-N-E      | P                                   | 5 46 26  |    |     |          | Compresión.                                                                    |
|      |               | Z          | i                                   | 5 46 41  |    |     |          |                                                                                |
|      |               | N-E        | (PR <sub>1</sub> )                  | 5 51 0   |    |     |          |                                                                                |
|      |               | N-E        | (S <sub>c</sub> P <sub>c</sub> S)   | 5 57 0   |    |     |          |                                                                                |
|      |               | N          | i (PS)                              | 5 59 14  |    |     |          |                                                                                |
|      |               | E          | (SR <sub>2</sub> )                  | 6 10 18  |    |     |          |                                                                                |
| 132  | » 6           | N-E        | L                                   | 6 23,5   |    |     |          |                                                                                |
|      |               | N          | M                                   | 6 34,0   | 18 | 17  | (12.000) |                                                                                |
|      |               | N          | M                                   | 6 34,0   |    |     |          |                                                                                |
| 133  | » 6           | Z-N        | P                                   | 15 15 9  |    |     |          |                                                                                |
|      |               | N          | L                                   | 6 14,0   |    |     |          |                                                                                |
|      |               | Z-N        | P                                   | 15 15 9  |    |     |          |                                                                                |
| 134  | » 8           | N-E        | e (S)                               | 9 37 16  |    |     |          |                                                                                |
|      |               | N          | (?)                                 | 9 44 49  |    |     |          |                                                                                |
|      |               | N-E        | L                                   | 9 49,5   |    |     |          |                                                                                |
| 135  | » 9           | E          | e (PR)                              | 22 16 10 |    |     |          |                                                                                |
|      |               | N-E        | (S)                                 | 22 19 50 |    |     |          |                                                                                |
|      |               | N-E        | (SR <sub>1</sub> )                  | 22 22 39 |    |     |          |                                                                                |
|      |               | N-E        | L                                   | 22 25,0  |    |     |          |                                                                                |
|      |               | N          | M                                   | 22 25,5  | 11 | 7   |          |                                                                                |
|      |               | E          | M                                   | 22 28,0  | 12 | 16  | (4.400)  |                                                                                |
| 136  | » 11          | N-E        | (P')                                | 22 39 3  |    |     |          |                                                                                |
|      |               | N-E        | e (PR <sub>1</sub> )                | 22 41 30 |    |     |          |                                                                                |
|      |               | N-E        | e (S)                               | 22 49 36 |    |     |          |                                                                                |
|      |               | N          | e (SR <sub>1</sub> )                | 22 59 23 |    |     |          |                                                                                |
|      |               | N          | e (SR <sub>2</sub> )                | 23 4 28  |    |     |          |                                                                                |
|      |               | N-E        | L                                   | 23 26,0  |    |     |          |                                                                                |
| 137  | » 12          | N          | M                                   | 23 39,0  | 23 | 18  | (15.000) |                                                                                |
|      |               | Z          | (PR <sub>1</sub> )                  | 17 3 15  |    |     |          |                                                                                |
|      |               | N          | i (S <sub>c</sub> P <sub>c</sub> S) | 17 9 50  |    |     |          |                                                                                |
| 138  | » 13          | N-E        | (SR <sub>1</sub> )                  | 17 17 45 |    |     |          |                                                                                |
|      |               | N-E        | L                                   | 17 33,5  |    |     |          |                                                                                |
|      |               | E          | M                                   | 17 41,0  | 22 | 65  |          |                                                                                |
|      |               | N          | M                                   | 17 47,5  | 20 | 102 |          |                                                                                |
|      |               | E          | M                                   | 17 47,5  | 17 | 48  | (11.000) |                                                                                |
|      |               | N-E        | L                                   | 2 52,0   |    |     |          |                                                                                |
| 139  | » 13          | Z          | P                                   | 19 33 46 |    |     |          |                                                                                |
|      |               | N          | L                                   | 19 51,0  |    |     |          |                                                                                |
| 140  | » 18          | E          | e P                                 | 0 25 50  |    |     |          | A 1 <sup>h</sup> 17 <sup>m</sup> saltó la pluma del bifilar de 700 kilogramos. |
|      |               | N-E        | e PR <sub>1</sub>                   | 0 29 43  |    |     |          |                                                                                |
|      |               | N-E        | i S                                 | 0 37 29  |    |     |          |                                                                                |
|      |               | N-E        | e PS                                | 0 38 38  |    |     |          |                                                                                |
|      |               | N-E        | e SR <sub>1</sub>                   | 0 44 14  |    |     |          |                                                                                |
|      |               | N-E        | L                                   | 1 0,0    |    |     |          |                                                                                |
| 140  | » 18          | N          | M                                   | 1 9,5    | 21 | 77  |          |                                                                                |
|      |               | E          | M                                   | 1 9,5    | 19 | 109 |          |                                                                                |
|      |               | N          | M                                   | 1 14,0   | 20 | 88  | 11.200   |                                                                                |
|      |               | N          | M                                   | 1 14,0   | 20 | 88  | 11.200   |                                                                                |

| Núm. | Fecha      | Com-<br>ponente | Fase                                | Hora |      |    | T  | A        | Δ  | Observaciones |
|------|------------|-----------------|-------------------------------------|------|------|----|----|----------|----|---------------|
|      |            |                 |                                     | h    | m    | s  |    |          |    |               |
| 141  | Octubre 18 | Z               | e                                   | 7    | 54   | 36 |    | μ        | km |               |
|      |            | Z               | i P                                 | 7    | 54   | 42 |    |          |    |               |
|      |            | E               | i                                   | 7    | 54   | 52 |    |          |    |               |
|      |            | Z-N-E           | i S                                 | 7    | 55   | 40 |    |          |    |               |
| 142  | » 18       | Z               | e P                                 | 11   | 25   | 43 |    |          |    |               |
|      |            | N               | (S <sub>c</sub> P <sub>c</sub> S)   | 11   | 36   | 9  |    |          |    |               |
|      |            | N               | (PS)                                | 11   | 41   | 19 |    |          |    |               |
|      |            | N               | (SR <sub>2</sub> )                  | 11   | 51   | 7  |    |          |    |               |
|      |            | N               | L                                   | 12   | 8,0  |    |    |          |    |               |
|      |            | N               | M                                   | 12   | 18,0 | 26 | 37 | (13.500) |    |               |
| 143  | » 18       | N               | e (PR <sub>1</sub> )                | 15   | 11   | 45 |    |          |    |               |
|      |            | N-E             | i (S <sub>c</sub> P <sub>c</sub> S) | 15   | 18   | 17 |    |          |    |               |
|      |            | N-E             | (SR <sub>1</sub> )                  | 15   | 26   | 27 |    |          |    |               |
|      |            | N-E             | L                                   | 15   | 45,0 |    |    |          |    |               |
|      |            | E               | M                                   | 15   | 50,0 | 21 |    |          |    |               |
| N    | M          | 15              | 51,0                                | 21   | 15   |    |    |          |    |               |
| 144  | » 18       | N-E             | L                                   | 22   | 47,0 |    |    |          |    |               |
| 145  | » 19       | N-E             | L                                   | 0    | 53,5 |    |    |          |    |               |
| 146  | » 19       | N-E             | L                                   | 5    | 26,0 |    |    |          |    |               |
| 147  | » 20       | N               | L                                   | 5    | 27,0 |    |    |          |    |               |
| 148  | » 22       | N-E             | L                                   | 7    | 45,0 |    |    |          |    |               |
| 149  | » 25       | Z               | (P)                                 | 1    | 2    | 10 |    |          |    | Compresión.   |
|      |            | N               | e (PR <sub>1</sub> )                | 1    | 5    | 19 |    |          |    |               |
|      |            | N               | e (S)                               | 1    | 13   | 47 |    |          |    |               |
|      |            | N               | e (SR <sub>2</sub> )                | 1    | 24   | 25 |    |          |    |               |
|      |            | N-E             | L                                   | 1    | 35,0 |    |    |          |    |               |
| 150  | » 31       | N-E             | L                                   | 19   | 16,0 |    |    |          |    |               |

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

|                    |         | Registro    | Com-<br>ponente | M         | T <sub>0</sub> | V    | $\epsilon$ | $\frac{r}{T_0^2}$ | Extensión<br>de 1 <sup>m</sup><br>en el registro |
|--------------------|---------|-------------|-----------------|-----------|----------------|------|------------|-------------------|--------------------------------------------------|
| Péndulo horizontal | Bifilar | Mecánico    | N—S             | kg<br>700 | s<br>15        | 150  | 0          | 0,006             | mm<br>15                                         |
| Idem idem          | idem    | Idem        | E—W             | 1100      | 20             | 200  | 0          | 0,008             | 15                                               |
| Idem idem          | Alfani  | Fotográfico | N—S             | 3         | 8              | 1000 | $\infty$   | "                 | 17                                               |
| Idem idem          | idem    | Idem        | E—W             | 3         | 8              | 465  | $\infty$   | "                 | 17                                               |
| Idem zenital       | idem    | Idem        | Z               | 3         | 5              | 600  | 1,81       | "                 | 17                                               |
| Idem vertical      |         | Mecánico    | E—W             | 700       | 2              | 270  | 0          | 0,060             | 15                                               |

## TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL

(GREENWICH)

| Núm. | Fecha       | Com-<br>ponente | Fase                                | Hora             | T  | A  | $\Delta$ | Observaciones |
|------|-------------|-----------------|-------------------------------------|------------------|----|----|----------|---------------|
| 151  | Noviembre 1 | N               | i (S)                               | h m s<br>6 20 37 | s  | μ  | km       |               |
|      |             | N               | i (SR <sub>1</sub> )                | 6 24 20          |    |    |          |               |
|      |             | E               | e (SR <sub>2</sub> )                | 6 26 37          |    |    |          |               |
|      |             | N-E             | L                                   | 6 30,5           |    |    |          |               |
|      |             | N               | M                                   | 6 35,0           |    |    |          |               |
|      |             | E               | M                                   | 6 35,5           |    |    |          |               |
| 152  | » 1         | N-E             | (PR <sub>1</sub> )                  | 16 46 25         | 18 | 14 | (6.000)  |               |
|      |             | N               | (PS)                                | 16 55 40         |    |    |          |               |
|      |             | N               | (SR <sub>1</sub> )                  | 17 0 5           |    |    |          |               |
|      |             | E               | (SR <sub>2</sub> )                  | 17 2 52          |    |    |          |               |
|      |             | N-E             | L                                   | 17 12,0          |    |    |          |               |
| 153  | » 5         | N               | M                                   | 17 16,5          | 19 | 23 | (10.100) |               |
|      |             | E               | M                                   | 17 16,5          |    |    |          |               |
|      |             | N-E             | L                                   | 22 11,0          |    |    |          |               |
| 154  | » 7         | N-E             | (S)                                 | 4 46 10          |    |    |          |               |
|      |             | N-E             | L                                   | 4 50,0           |    |    |          |               |
| 155  | » 10        | N-E             | e (?)                               | 18 44 28         |    |    |          |               |
|      |             | N-E             | L                                   | 18 50,0          |    |    |          |               |
| 156  | » 11        | N-E             | L                                   | 14 32,0          |    |    |          |               |
| 157  | » 12        | N-E             | L                                   | 22 30,0          |    |    |          |               |
| 158  | » 14        | N               | e (SR <sub>1</sub> )                | 20 39 2          |    |    |          |               |
|      |             | N               | e (SR <sub>2</sub> )                | 20 44 36         |    |    |          |               |
|      |             | N-E             | L                                   | 21 9,5           |    |    |          |               |
| 159  | » 17        | N               | L                                   | 9 1,0            |    |    |          |               |
| 160  | » 25        | N               | e (S <sub>c</sub> P <sub>c</sub> S) | 10 20 53         |    |    | (12.500) |               |
|      |             | N               | e (SR <sub>1</sub> )                | 10 30 45         |    |    |          |               |
|      |             | N               | L                                   | 10 52,0          |    |    |          |               |
| 161  | » 30        | N-E             | i (S)                               | 4 0 26           |    |    |          |               |
| 162  | Diciembre 2 | N-E             | L                                   | 0 40,0           |    |    |          |               |
| 163  | » 2         | N-E             | L                                   | 17 40,0          |    |    |          |               |
| 164  | » 5         | N               | e (PR <sub>1</sub> )                | 18 13 26         |    |    | (17.500) |               |
|      |             | N               | e (SR <sub>1</sub> )                | 18 33 23         |    |    |          |               |
|      |             | N-E             | L                                   | 19 6,0           |    |    |          |               |
| 165  | » 8         | N               | L                                   | 16 12,0          |    |    |          |               |
| 166  | » 8         | N               | L                                   | 18 2,0           |    |    |          |               |
| 167  | » 8         | N               | L                                   | 23 15,0          |    |    |          |               |
| 168  | » 9         | N-E             | L                                   | 8 50,0           |    |    |          |               |
| 169  | » 14        | Z-N-E           | i P                                 | 1 42 2           |    |    | 7.400    |               |
|      |             | N-E             | i S                                 | 1 50 57          |    |    |          |               |
| 170  | » 14        | N-E             | e P                                 | 22 17 26         |    |    |          |               |
|      |             | N-E             | e S                                 | 22 27 26         |    |    |          |               |
|      |             | E               | L                                   | 22 40,0          |    |    |          |               |
|      |             | E               | M                                   | 22 49,5          |    |    |          |               |
|      |             | N               | M                                   | 22 50,0          |    |    |          |               |

| Núm. | Fecha        | Com-<br>ponente | Fase                                             | Hora |      |    | T   | A   | Δ        | Observaciones        |
|------|--------------|-----------------|--------------------------------------------------|------|------|----|-----|-----|----------|----------------------|
|      |              |                 |                                                  | h    | m    | s  |     |     |          |                      |
| 171  | Diciembre 15 | Z-E             | (P <sub>1</sub> )                                | 7    | 27   | 43 | 30  | 203 | (16.500) |                      |
|      |              | E               | (SR <sub>1</sub> )                               | 7    | 50   | 33 |     |     |          |                      |
|      |              | N               | M                                                | 8    | 25,0 |    |     |     |          |                      |
|      |              | E               | M                                                | 8    | 28,0 |    |     |     |          |                      |
|      |              | N               | M                                                | 8    | 28,5 |    |     |     |          |                      |
|      |              | N               | M                                                | 9    | 5,0  | 19 | 107 |     |          |                      |
| 172  | > 16         | Z-E             | P                                                | 17   | 8    | 10 |     |     | 7.300    | Compresión.          |
|      |              | N-E             | S                                                | 17   | 17   | 3  |     |     |          |                      |
| 173  | > 17         | N-E             | L                                                | 14   | 46,0 |    |     |     |          |                      |
| 174  | > 17         | Z               | e P                                              | 19   | 30   | 41 |     |     | (12.000) |                      |
|      |              | N               | (PR <sub>1</sub> )                               | 19   | 36   | 27 |     |     |          |                      |
|      |              | N               | (S)                                              | 19   | 42   | 26 |     |     |          |                      |
|      |              | N               | i (SR)                                           | 19   | 56   | 14 |     |     |          |                      |
|      |              | N-E             | L                                                | 20   | 7,0  |    |     |     |          |                      |
| 175  | > 18         | N-E             | L                                                | 7    | 57,0 |    |     |     |          |                      |
| 176  | > 20         | Z               | P <sub>1</sub>                                   | 18   | 56   | 54 |     |     | (18.500) |                      |
|      |              | N-E             | (?)                                              | 18   | 57   | 1  |     |     |          |                      |
|      |              | N               | (S <sub>c</sub> P <sub>c</sub> P <sub>c</sub> S) | 19   | 6    | 21 |     |     |          |                      |
|      |              | E               | (SR <sub>1</sub> )                               | 19   | 20   | 29 |     |     |          |                      |
|      |              | N-E             | L                                                | 19   | 56,0 |    |     |     |          |                      |
| 177  | > 24         | N-E             | (S)                                              | 12   | 45   | 48 |     |     |          | Fuertes microsismos. |
| 178  | > 28         | E               | (P)                                              | 2    | 49   | 34 |     |     | (9.500)  | Fuertes microsismos. |
|      |              | N-E             | (S)                                              | 3    | 0    | 22 |     |     |          |                      |
| 179  | > 29-30      | E               | (P <sub>1</sub> )                                | 23   | 59   | 16 |     |     | (17.500) | Fuertes microsismos. |
|      |              | N               | (S <sub>c</sub> P <sub>c</sub> S)                | 0    | 7    | 8  |     |     |          |                      |
|      |              | N-E             | L                                                | 0    | 54,0 |    |     |     |          |                      |

El Director,

*Luis Alvarez*