

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. | Componen-<br>te. | Masa<br>kg | Periodo<br>s | Amplifica-<br>ción. | Velocidad<br>de registro. |      | $\frac{r}{T_0^2}$ |
|--------------------|-----------|------------------|------------|--------------|---------------------|---------------------------|------|-------------------|
|                    |           |                  |            |              |                     | m                         | mm   |                   |
| Péndulo horizontal | Milne     | Fotográfico      | N-S        | »            | 20                  | 7                         | 1 4  |                   |
| Idem idem          | idem      | Idem             | E-W        | »            | 20                  | 7                         | 1 4  |                   |
| Idem idem          | Bifilar   | Mecánico         | E-W        | 60           | 24                  | 12                        | 1 6  | 0,0004            |
| Idem idem          | idem      | Idem             | N-S        | 600          | 13                  | 90                        | 1 15 | 0,005             |
| Idem idem          | idem      | Idem             | N-S        | 1100         | 30                  | 16                        | 1 15 | 0,001             |
| Idem vertical      | vertical  | Idem             | E-W        | 700          | 2                   | 270                       | 1 15 | 0,06              |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Fecha     | Fase                                          | Hora<br>h m s                                       | AMPLITUD |       | $\Delta$<br>km | Observaciones |
|-----------|-----------------------------------------------|-----------------------------------------------------|----------|-------|----------------|---------------|
|           |                                               |                                                     | N. S.    | E. W. |                |               |
| Enero 1   | M <sub>N</sub><br>M <sub>E</sub>              | 10 30,0<br>10 24,0                                  | 0,85     | 0,80  |                |               |
| » 3       | L<br>M <sub>N</sub><br>M <sub>E</sub>         | 16 21,0<br>16 25,5<br>16 32,0                       | 1,10     |       |                |               |
| » 4       | M <sub>N</sub>                                | 2 29,0                                              |          |       |                |               |
| » 4       | M <sub>N</sub>                                | 4 45,5                                              |          |       |                |               |
| » 5       | M <sub>N</sub><br>M <sub>E</sub>              | 15 22,0<br>15 21,5                                  |          | 0,35  |                |               |
| » 6       | M <sub>N</sub><br>M <sub>E</sub>              | 20 5,5<br>20 5,5                                    | 0,30     | 0,25  |                |               |
| » 7       | (S)<br>L<br>M <sub>N</sub><br>M <sub>E</sub>  | 4 31 24<br>4 58,0<br>5 12,5<br>5 4,5                | 2,00     | 2,75  |                |               |
| » 8       | M <sub>N</sub><br>M <sub>E</sub>              | 7 34,5<br>7 26,5                                    |          | 0,35  |                |               |
| » 9       | P<br>i S<br>M <sub>N</sub><br>M <sub>E</sub>  | 2 11 29<br>2 19 24<br>2 29,0<br>2 31,5              | 0,70     | 0,55  | 6.350          |               |
| » 17      | (S)<br>L<br>M <sub>N</sub>                    | 19 11 20<br>19 35,0<br>19 48,0                      | 0,60     |       |                |               |
| » 21      | P<br>S<br>i SR<br>L<br>M <sub>N</sub>         | 19 34 34<br>19 45 5<br>19 47 5<br>20 3,5<br>20 21,5 | 9,20     |       | 9.400          |               |
| » 27      | (P)<br>S<br>M <sub>N</sub><br>M <sub>E</sub>  | 22 56 57<br>23 11 3<br>24 8,5<br>24 4,0             | 0,70     | 0,50  | > 11.000       |               |
| Febrero 3 | (PS)<br>L<br>M <sub>N</sub><br>M <sub>E</sub> | 22 35 46<br>23 5,0<br>23 17,0<br>23 16,5            | 0,70     | 0,60  |                |               |
| » 13      | (P)<br>L<br>M <sub>N</sub><br>M <sub>E</sub>  | 3 0 27<br>3 25,0<br>3 34,0<br>3 28,5                | 0,80     | 1,15  |                |               |
| » 13-14   | M <sub>N</sub><br>M <sub>E</sub>              | 0 10,0<br>0 3,0                                     |          |       |                |               |
| » 14      | M <sub>N</sub><br>M <sub>E</sub>              | 7 4,0<br>6 55,0                                     |          |       |                |               |
| » 19      | M <sub>N</sub><br>M <sub>E</sub>              | 10 18,0<br>10 4,0                                   |          |       |                |               |

| Fecha      | Fase           | Hora                                           | AMPLITUD |       | $\Delta$ | Observaciones |
|------------|----------------|------------------------------------------------|----------|-------|----------|---------------|
|            |                |                                                | N. S.    | E. W. |          |               |
| Febrero 23 | i P            | 8 <sup>h</sup> 21 <sup>m</sup> 37 <sup>s</sup> | 3,25     | 5,90  | 9.400    | km            |
|            | i S            | 8 32 01                                        |          |       |          |               |
|            | L              | 8 46,5                                         |          |       |          |               |
|            | M <sub>N</sub> | 9 4,5                                          |          |       |          |               |
|            | M <sub>E</sub> | 9 2,0                                          |          |       |          |               |
| >          | M <sub>N</sub> | 17 43,0                                        |          |       |          |               |
|            | M <sub>E</sub> | 17 42,0                                        |          | 0,75  |          |               |
| >          | M <sub>N</sub> | 5 17,0                                         |          |       |          |               |
|            | M <sub>E</sub> | 5 16,5                                         |          |       |          |               |
| >          | M <sub>N</sub> | 22 33,0                                        |          |       |          |               |

El Director,

*Leon Herrera*

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 $\varphi = 36^{\circ} 27' 42''$ 
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 $a = 28^m$ 

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

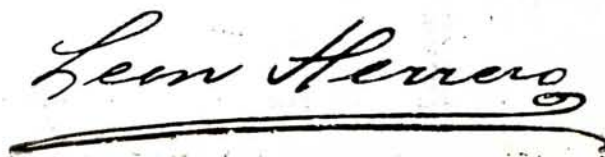
|                    | Registro. | Componen-<br>te. | Masa<br>kg | Periodo<br>s | Amplifica-<br>ción. | Velocidad<br>de registro. |      | $\frac{r}{T_0^2}$ |
|--------------------|-----------|------------------|------------|--------------|---------------------|---------------------------|------|-------------------|
|                    |           |                  |            |              |                     | m                         | mm   |                   |
| Péndulo horizontal | Milne     | Fotográfico      | N-S        | »            | 20                  | 7                         | I 4  |                   |
| Idem idem          | idem      | Idem             | E-W        | »            | 20                  | 7                         | I 4  |                   |
| Idem idem          | Bifilar   | Mecánico         | E-W        | 60           | 24                  | 12                        | I 6  | 0,0004            |
| Idem idem          | idem      | Idem             | N-S        | 600          | 13                  | 90                        | I 15 | 0,005             |
| Idem idem          | idem      | Idem             | N-S        | 1100         | 30                  | 16                        | I 15 | 0,001             |
| Idem vertical      |           | Idem             | E-W        | 700          | 2                   | 270                       | I 15 | 0,06              |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Fecha | Fase | Hora           | AMPLITUD |         | $\Delta$ | Observaciones                                                                                                                                                                               |
|-------|------|----------------|----------|---------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |      |                | N. S.    | E. W.   |          |                                                                                                                                                                                             |
| Marzo | 2    | i P            | h m s    |         |          | A las 18 <sup>h</sup> 25 <sup>m</sup> saltaron las plumas de los registradores mecánicos.<br>La oscilación de los sismógrafos fotográficos fué superior a la amplitud que pueden registrar. |
|       |      | i PR           | 17 44 47 |         |          |                                                                                                                                                                                             |
|       |      | i PR           | 17 49 5  |         |          |                                                                                                                                                                                             |
|       |      | i S            | 17 52 50 |         |          |                                                                                                                                                                                             |
|       |      | L              | 17 55 49 |         |          |                                                                                                                                                                                             |
|       |      | M              | 18 14,0  | > 12,50 | > 18,00  | 11.100                                                                                                                                                                                      |
| »     | 3    | M <sub>N</sub> | 5 44,5   |         |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 5 45,5   |         |          |                                                                                                                                                                                             |
| »     | 3    | i S            | 9 50 24  |         |          |                                                                                                                                                                                             |
|       |      | M <sub>N</sub> | 10 18,5  | 1,25    |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 10 18,5  |         | 1,10     |                                                                                                                                                                                             |
| »     | 3    | M <sub>N</sub> | 13 2,5   |         |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 13 2,5   |         |          |                                                                                                                                                                                             |
| »     | 3    | M <sub>N</sub> | 16 13,0  | 0,35    |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 16 7,0   |         |          |                                                                                                                                                                                             |
| »     | 3    | M <sub>N</sub> | 17 18,5  |         |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 17 18,0  |         |          |                                                                                                                                                                                             |
| »     | 3    | M <sub>N</sub> | 20 13,0  |         |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 20 12,5  |         |          |                                                                                                                                                                                             |
| »     | 3    | M <sub>N</sub> | 21 26,0  |         |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 21 25,0  |         |          |                                                                                                                                                                                             |
| »     | 8    | M <sub>N</sub> | 2 41,0   | 0,25    |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 2 40,5   |         | 0,25     |                                                                                                                                                                                             |
| »     | 9    | M <sub>N</sub> | 22 19,5  |         |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 22 27,0  |         |          |                                                                                                                                                                                             |
| »     | 11   | (S)            | 2 17 26  |         |          |                                                                                                                                                                                             |
|       |      | L              | 2 35,5   |         |          |                                                                                                                                                                                             |
|       |      | M <sub>N</sub> | 2 52,5   | 0,70    |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 2 43,0   |         | 1,30     |                                                                                                                                                                                             |
| »     | 11   | (S)            | 14 46 18 |         |          |                                                                                                                                                                                             |
|       |      | M <sub>N</sub> | 15 27,0  | 1,05    |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 15 27,0  |         | 0,80     |                                                                                                                                                                                             |
| »     | 11   | (S)            | 20 0 5   |         |          |                                                                                                                                                                                             |
|       |      | M <sub>N</sub> | 20 38,0  | 0,30    |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 20 41,5  |         | 0,30     |                                                                                                                                                                                             |
| »     | 12   | M <sub>N</sub> | 6 13,0   |         |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 6 7,0    |         |          |                                                                                                                                                                                             |
| »     | 13   | M <sub>N</sub> | 8 22,0   |         |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 8 16,5   |         |          |                                                                                                                                                                                             |
| »     | 14   | e (P)          | 1 25 26  |         |          |                                                                                                                                                                                             |
|       |      | e (S)          | 1 34 50  |         |          |                                                                                                                                                                                             |
|       |      | L              | 1 47,5   |         |          |                                                                                                                                                                                             |
|       |      | M <sub>N</sub> | 1 51,5   | 1,60    |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 1 53,0   |         | 1,80     | (8.050)                                                                                                                                                                                     |
| »     | 15   | M <sub>N</sub> | 6 39,0   | 0,30    |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 6 29,5   |         | 0,35     |                                                                                                                                                                                             |
| »     | 17   | P              | 1 19 16  |         |          |                                                                                                                                                                                             |
|       |      | S              | 1 19 35  |         |          | 180                                                                                                                                                                                         |
| »     | 17   | P              | 16 8 18  |         |          |                                                                                                                                                                                             |
|       |      | i S            | 16 19 26 |         |          |                                                                                                                                                                                             |
|       |      | L              | 16 37,0  |         |          |                                                                                                                                                                                             |
|       |      | M <sub>N</sub> | 16 56,5  | 1,40    |          |                                                                                                                                                                                             |
|       |      | M <sub>E</sub> | 16 51,5  |         | 1,90     | 10.200                                                                                                                                                                                      |

| Fecha | Fase  | Hora           | AMPLITUD |       | $\Delta$ | Observaciones |                             |                                             |
|-------|-------|----------------|----------|-------|----------|---------------|-----------------------------|---------------------------------------------|
|       |       |                | N. S.    | E. W. |          |               |                             |                                             |
| Marzo | 17    | (P)            | h        | m     | s        | 1,20          | 1,50                        | (9.950)                                     |
|       |       | S              | 19       | 51    | 42       |               |                             |                                             |
|       |       | L              | 20       | 2     | 38       |               |                             |                                             |
|       |       | M <sub>N</sub> | 20       | 21,5  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 21       | 4,5   |          |               |                             |                                             |
| »     | 18    | (P)            | 3        | 19    | 32       | 0,35          | 1,10                        | (9.900)                                     |
|       |       | (S)            | 3        | 30    | 26       |               |                             |                                             |
|       |       | L              | 3        | 46,5  |          |               |                             |                                             |
|       |       | M <sub>N</sub> | 3        | 50,5  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 4        | 1,0   |          |               |                             |                                             |
| »     | 18    | M <sub>N</sub> | 19       | 28,0  |          | 0,60          |                             |                                             |
|       |       | M <sub>E</sub> | 19       | 26,5  |          |               |                             |                                             |
| »     | 18-19 | M <sub>N</sub> | 0        | 18,5  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 0        | 16,0  |          |               |                             |                                             |
| »     | 22    | M <sub>N</sub> | 18       | 28,5  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 18       | 32,0  |          |               |                             |                                             |
| »     | 23    | M <sub>N</sub> | 18       | 29,5  | 0,60     | 0,35          |                             |                                             |
|       |       | M <sub>E</sub> | 18       | 28,5  |          |               |                             |                                             |
| »     | 29    | M <sub>N</sub> | 20       | 15,0  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 20       | 13,5  |          |               |                             |                                             |
| Abril | 1     | M <sub>N</sub> | 17       | 5,5   | 0,65     | 0,40          |                             |                                             |
|       |       | M <sub>E</sub> | 17       | 3,5   |          |               |                             |                                             |
| »     | 1     | M <sub>N</sub> | 23       | 48,0  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 23       | 41,0  |          |               |                             |                                             |
| »     | 2     | M <sub>N</sub> | 11       | 16,0  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 11       | 15,0  |          |               |                             |                                             |
| »     | 9     | (PR)           | 3        | 4     | 22       | 2,65          | 1,30                        |                                             |
|       |       | (S)            | 3        | 11    | 4        |               |                             |                                             |
|       |       | L              | 3        | 37,0  |          |               |                             |                                             |
|       |       | M <sub>N</sub> | 3        | 54,5  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 3        | 52,5  |          |               |                             |                                             |
| »     | 9     | M <sub>N</sub> | 4        | 52,5  | 0,75     | 0,80          |                             |                                             |
|       |       | M <sub>E</sub> | 4        | 52,5  |          |               |                             |                                             |
| »     | 9     | M <sub>N</sub> | 11       | 37,5  | 0,30     |               |                             |                                             |
|       |       | M <sub>E</sub> | 11       | 35,0  |          |               |                             |                                             |
| »     | 9     | M <sub>N</sub> | 21       | 59,5  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 21       | 57,5  |          |               |                             |                                             |
| »     | 11    | i P            | 2        | 30    | 36       |               |                             | Sentido en Olvera.<br>(Provincia de Cádiz). |
|       |       | S              | 2        | 30    | 47       |               | 120                         |                                             |
| »     | 11    | P              | 3        | 7     | 54       |               |                             | Réplica del anterior.                       |
|       |       | S              | 3        | 8     | 6        |               | 120                         |                                             |
| »     | 11    | (P)            | 0        | 49    | 33       |               |                             |                                             |
|       |       | M <sub>N</sub> | 7        | 20,0  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 7        | 20,0  |          |               |                             |                                             |
| »     | 11    | (P)            | 14       | 52    | 26       |               |                             |                                             |
|       |       | (S)            | 14       | 52    | 43       |               |                             |                                             |
| »     | 13    | M <sub>N</sub> | 23       | 28,0  | 0,30     | 0,75          |                             |                                             |
|       |       | M <sub>E</sub> | 23       | 27,5  |          |               |                             |                                             |
| »     | 16    | M <sub>N</sub> | 7        | 42,5  | 0,30     | 0,30          |                             |                                             |
|       |       | M <sub>E</sub> | 7        | 47,5  |          |               |                             |                                             |
| »     | 16    | (S)            | 19       | 39,5  | 0,25     | 0,35          |                             |                                             |
|       |       | M <sub>N</sub> | 20       | 43,0  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 20       | 43,5  |          |               |                             |                                             |
| »     | 19    | M <sub>E</sub> | 4        | 1,0   |          |               |                             |                                             |
| »     | 19    | M <sub>E</sub> | 7        | 51,5  |          | 1,00          |                             |                                             |
| »     | 23    | P              | 6        | 3     | 19       | 2,25          | 1,80                        | 3.125                                       |
|       |       | S              | 6        | 8     | 11       |               |                             |                                             |
|       |       | L              | 6        | 10,5  |          |               |                             |                                             |
|       |       | M <sub>N</sub> | 6        | 16,5  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 6        | 15,5  |          |               |                             |                                             |
| »     | 23    | L              | 8        | 6,0   | 0,85     | 0,70          |                             |                                             |
|       |       | M <sub>N</sub> | 8        | 20,5  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 8        | 16,5  |          |               |                             |                                             |
| »     | 27    | i P            | 2        | 48    | 7        | 5,20          | 3,50                        | 9.000                                       |
|       |       | i S            | 2        | 58    | 17       |               |                             |                                             |
|       |       | L              | 3        | 12,0  |          |               |                             |                                             |
|       |       | M <sub>N</sub> | 3        | 33,5  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 3        | 28,5  |          |               |                             |                                             |
| »     | 27    | M <sub>N</sub> | 5        | 36,0  | 0,55     | 1,05          | Confundido con el anterior. |                                             |
|       |       | M <sub>E</sub> | 5        | 13,0  |          |               |                             |                                             |
| »     | 27    | M <sub>N</sub> | 12       | 59,0  | 0,50     | 0,55          |                             |                                             |
|       |       | M <sub>E</sub> | 12       | 53,0  |          |               |                             |                                             |
| »     | 28    | M <sub>N</sub> | 22       | 46,5  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 22       | 46,5  |          |               |                             |                                             |
| »     | 30    | M <sub>N</sub> | 5        | 41,5  |          |               |                             |                                             |
|       |       | M <sub>E</sub> | 5        | 33,0  |          |               |                             |                                             |

El Director,



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

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

|                    |         |             | Registro. | Componen-<br>te. | Masa | Periodo | Amplifica-<br>ción. | Velocidad<br>de registro. | $\frac{r}{T_0^2}$ |
|--------------------|---------|-------------|-----------|------------------|------|---------|---------------------|---------------------------|-------------------|
|                    |         |             |           |                  | kg   | s       |                     | m mm                      |                   |
| Péndulo horizontal | Milne   | Fotográfico | N-S       | »                | 20   | 7       | 1 4                 |                           |                   |
| Idem idem          | idem    | Idem        | E-W       | »                | 20   | 7       | 1 4                 |                           |                   |
| Idem idem          | Bifilar | Mecánico    | E-W       | 60               | 24   | 12      | 1 6                 | 0,0004                    |                   |
| Idem idem          | idem    | Idem        | N-S       | 600              | 13   | 90      | 1 15                | 0,005                     |                   |
| Idem idem          | idem    | Idem        | N-S       | 1100             | 30   | 16      | 1 15                | 0,001                     |                   |
| Idem vertical      |         | Idem        | E-W       | 700              | 2    | 270     | 1 15                | 0,06                      |                   |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Fecha   | Fase           | Hora     | AMPLITUD |       | $\Delta$ | Observaciones |
|---------|----------------|----------|----------|-------|----------|---------------|
|         |                |          | N. S.    | E. W. |          |               |
| Julio 9 | P              | 1 54 06  | 0,65     | 1,05  | 10.900   |               |
|         | S              | 2 5 42   |          |       |          |               |
|         | L              | 2 24,0   |          |       |          |               |
|         | M <sub>N</sub> | 2 31,5   |          |       |          |               |
|         | M <sub>E</sub> | 2 29,5   |          |       |          |               |
| » 9     | M <sub>N</sub> | 6 29,5   |          |       |          |               |
|         | M <sub>E</sub> | 6 29,0   |          |       |          |               |
| » 9     | e P            | 9 51 35  | 0,50     | 0,40  | 11.550   |               |
|         | S              | 10 3 39  |          |       |          |               |
|         | L              | 10 22,0  |          |       |          |               |
|         | M <sub>N</sub> | 10 39,0  |          |       |          |               |
|         | M <sub>E</sub> | 10 31,5  |          |       |          |               |
| » 9     | P              | 12 54 39 | 1,60     | 2,20  | 10.700   |               |
|         | S              | 13 6 7   |          |       |          |               |
|         | L              | 13 21,0  |          |       |          |               |
|         | M <sub>N</sub> | 13 36,0  |          |       |          |               |
|         | M <sub>E</sub> | 13 35,0  |          |       |          |               |
| » 9     | M <sub>N</sub> | 17 14,0  |          |       |          |               |
|         | M <sub>E</sub> | 17 11,5  |          |       |          |               |
| » 9     | M <sub>N</sub> | 18 58,0  |          |       |          |               |
|         | M <sub>E</sub> | 18 56,0  |          |       |          |               |
| » 10    | e P            | 3 34 47  | 1,00     | 1,20  | 9.300    |               |
|         | e S            | 3 45 13  |          |       |          |               |
|         | L              | 4 6,0    |          |       |          |               |
|         | M <sub>N</sub> | 4 17,0   |          |       |          |               |
|         | M <sub>E</sub> | 4 16,0   |          |       |          |               |
| » 10    | M <sub>N</sub> | 12 6,0   |          |       |          |               |
|         | M <sub>E</sub> | 12 5,0   |          |       |          |               |
| » 18    | P              | 6 5 5    | 1,20     | 0,60  | 150      |               |
|         | S              | 6 5 21   |          |       |          |               |
|         | M <sub>N</sub> | 6 5,5    |          |       |          |               |
|         | M <sub>E</sub> | 6 5,5    |          |       |          |               |
| » 18    | M <sub>N</sub> | 20 29,5  |          |       |          |               |
|         | M <sub>E</sub> | 20 22,5  |          |       |          |               |
| » 19    | L              | 14 28,0  | 0,35     | 0,40  |          |               |
|         | M <sub>N</sub> | 14 39,5  |          |       |          |               |
|         | M <sub>E</sub> | 14 32,5  |          |       |          |               |
| » 19    | M <sub>N</sub> | 16 6,0   | 0,35     | 0,40  |          |               |
|         | M <sub>E</sub> | 15 58,5  |          |       |          |               |
| » 19    | M <sub>N</sub> | 20 26,0  |          |       |          |               |
|         | M <sub>E</sub> | 20 25,0  |          |       |          |               |
| » 20-21 | M <sub>N</sub> | 0 22,5   |          |       |          |               |
|         | M <sub>E</sub> | 0 13,5   |          |       |          |               |
| » 21    | (P)            | 20 20 41 | 1,50     | 1,80  | (8.900)  |               |
|         | (S)            | 20 30 47 |          |       |          |               |
|         | L              | 20 48,0  |          |       |          |               |
|         | M <sub>N</sub> | 21 1,5   |          |       |          |               |
|         | M <sub>E</sub> | 21 1,0   |          |       |          |               |
| » 22    | P              | 21 8 21  | 2,80     |       | 9.400    |               |
|         | i S            | 21 18 51 |          |       |          |               |
|         | L              | 21 33,0  |          |       |          |               |
|         | M <sub>N</sub> | 22 5,0   |          |       |          |               |
| » 23    | M <sub>N</sub> | 5 13,5   |          |       |          |               |

| Fecha    | Fase           | Hora                  | AMPLITUD |       | Δ        | Observaciones |
|----------|----------------|-----------------------|----------|-------|----------|---------------|
|          |                |                       | N. S.    | E. W. |          |               |
| Julio 24 | e (P)          | 19 17 28 <sup>s</sup> | 0,65     | 1,50  | > 14.000 |               |
|          | e (S)          | 19 33 04              |          |       |          |               |
|          | L              | 20 16,0               |          |       |          |               |
|          | M <sub>N</sub> | 20 33,0               |          |       |          |               |
|          | M <sub>E</sub> | 20 51,5               |          |       |          |               |
| » 30     | M <sub>N</sub> | 18 55,0               |          |       |          |               |
|          | M <sub>E</sub> | 18 50,0               |          |       |          |               |
| » 31     | M <sub>N</sub> | 11 51,5               | 0,70     |       |          |               |
| Agosto 5 | M <sub>N</sub> | 2 22,0                |          |       |          |               |
|          | M <sub>E</sub> | 2 12,0                |          |       |          |               |
| » 11     | (S)            | 9 17 00               | 0,35     | 0,55  |          |               |
|          | M <sub>N</sub> | 9 45,5                |          |       |          |               |
|          | M <sub>E</sub> | 9 45,5                |          |       |          |               |
| » 13     | M <sub>N</sub> | 10 29,5               | 0,55     |       |          |               |
|          | M <sub>E</sub> | 10 26,5               |          | 1,45  |          |               |
| » 15     | M <sub>N</sub> | 0 57,0                |          |       |          |               |
|          | M <sub>E</sub> | 0 54,5                |          | 0,30  |          |               |
| » 15     | M <sub>N</sub> | 4 2,0                 |          |       |          |               |
|          | M <sub>E</sub> | 4 1,5                 |          |       |          |               |
| » 20     | M <sub>N</sub> | 12 58,5               | 0,55     |       |          |               |
|          | M <sub>E</sub> | 12 55,5               |          | 0,70  |          |               |
| » 22     | (P)            | 8 30 54               |          |       |          |               |
|          | M <sub>N</sub> | 9 16,5                |          |       |          |               |
| » 22     | (S)            | 11 21 57              | 0,50     |       |          |               |
|          | L              | 11 44,0               |          |       |          |               |
|          | M <sub>N</sub> | 11 54,0               |          |       |          |               |
|          |                |                       |          |       |          |               |
| » 25     | P              | 8 3 9                 | 5,80     | 5,10  | 9.600    |               |
|          | S              | 8 13 50               |          |       |          |               |
|          | L              | 8 31,0                |          |       |          |               |
|          | M <sub>N</sub> | 8 49,0                |          |       |          |               |
|          | M <sub>E</sub> | 8 38,5                |          |       |          |               |
| » 26     | M <sub>N</sub> | 21 34,0               | 0,20     |       |          |               |
|          | M <sub>E</sub> | 21 34,5               |          | 0,30  |          |               |
| » 28     | e P            | 22 32 40              | 9,50     | 13,0  | 10.400   |               |
|          | i S            | 22 43 58              |          |       |          |               |
|          | M <sub>N</sub> | 23 16,0               |          |       |          |               |
|          | M <sub>E</sub> | 23 19,5               |          |       |          |               |
| » 29     | e (PR)         | 15 5 42               |          |       |          |               |
|          | i S            | 15 12 28              |          |       | (9.400)  |               |

El Director,

*Leon Herrera*

BOLETIN SÍSMICO  
DEL  
INSTITUTO Y OBSERVATORIO DE MARINA  
SAN FERNANDO

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

Subsuelo: ROCA CALCÁREA.

INSTRUMENTOS

|                    | Registro. | Componen-<br>te. | Masa | Periodo | Amplifica-<br>ción. | Velocidad<br>de registro. |   | $\frac{r}{T_0^2}$ |        |
|--------------------|-----------|------------------|------|---------|---------------------|---------------------------|---|-------------------|--------|
|                    |           |                  |      |         |                     | kg                        | s |                   | m      |
| Péndulo horizontal | Milne     | Fotográfico      | N-S  | »       | 20                  | 7                         | 1 | 4                 |        |
| Idem idem          | idem      | Idem             | E-W  | »       | 20                  | 7                         | 1 | 4                 |        |
| Idem idem          | Bifilar   | Mecánico         | E-W  | 60      | 24                  | 12                        | 1 | 6                 | 0,0004 |
| Idem idem          | idem      | Idem             | N-S  | 600     | 13                  | 90                        | 1 | 15                | 0,005  |
| Idem idem          | idem      | Idem             | N-S  | 1100    | 30                  | 16                        | 1 | 15                | 0,001  |
| Idem vertical      | idem      | Idem             | E-W  | 700     | 2                   | 270                       | 1 | 15                | 0,06   |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Fecha        | Fase           | Hora                                            | AMPLITUD |       | $\Delta$ | Observaciones           |
|--------------|----------------|-------------------------------------------------|----------|-------|----------|-------------------------|
|              |                |                                                 | N. S.    | E. W. |          |                         |
| Septiembre 2 | e (P)          | 16 <sup>h</sup> 58 <sup>m</sup> 58 <sup>s</sup> | 0,55     | 0,35  | > 13.000 |                         |
|              | i (PR)         | 17 4 43                                         |          |       |          |                         |
|              | (S)            | 17 13 30                                        |          |       |          |                         |
|              | M <sub>N</sub> | 17 51,0                                         |          |       |          |                         |
|              | M <sub>E</sub> | 17 50,0                                         |          |       |          |                         |
| » 6          | M <sub>N</sub> | 2 51,0                                          |          |       |          |                         |
| » 6          | M <sub>E</sub> | 2 44,5                                          |          |       |          |                         |
| » 6          | M <sub>N</sub> | 11 3,0                                          |          |       |          |                         |
| » 6          | M <sub>E</sub> | 10 56,5                                         |          |       |          |                         |
| » 6          | M <sub>N</sub> | 18 33,0                                         |          | 0,35  |          |                         |
| » 6          | M <sub>E</sub> | 18 32,0                                         |          |       |          |                         |
| » 6          | (P)            | 22 27 31                                        | 0,50     | 0,70  |          | Sismograma muy confuso. |
| » 6          | i (PR)         | 22 32 34                                        |          |       |          |                         |
| » 6          | i (S)          | 22 42 12                                        |          |       |          |                         |
| » 6          | (L)            | 22 52,5                                         |          |       |          |                         |
| » 6          | M <sub>N</sub> | 22 57,5                                         |          |       |          |                         |
| » 6          | M <sub>E</sub> | 22 57,0                                         |          |       |          |                         |
| » 7          | M <sub>N</sub> | 23 32,0                                         |          |       |          |                         |
| » 7          | M <sub>E</sub> | 23 34,0                                         |          |       |          |                         |
| » 8          | M <sub>N</sub> | 7 2,5                                           |          |       |          |                         |
| » 8          | M <sub>E</sub> | 7 4,0                                           |          |       |          |                         |
| » 9          | M <sub>N</sub> | 5 58,0                                          |          |       |          |                         |
| » 9          | M <sub>E</sub> | 5 58,0                                          |          |       |          |                         |
| » 9          | P              | 21 40 14                                        | 0,35     | 0,50  | (10.100) |                         |
| » 9          | e S            | 21 51 19                                        |          |       |          |                         |
| » 9          | M <sub>N</sub> | 23 7,5                                          |          |       |          |                         |
| » 9          | M <sub>E</sub> | 23 13,0                                         |          |       |          |                         |
| » 13         | M <sub>N</sub> | 5 14,0                                          |          |       |          |                         |
| » 13         | M <sub>E</sub> | 5 4,0                                           |          |       |          |                         |
| » 21         | M <sub>N</sub> | 0 45,0                                          |          |       |          |                         |
| » 21         | M <sub>E</sub> | 0 38,5                                          |          |       |          |                         |
| » 21         | M <sub>N</sub> | 4 19,5                                          | 0,30     |       |          |                         |
| » 21         | M <sub>E</sub> | 4 13,0                                          |          | 0,35  |          |                         |
| » 21         | e P            | 10 31 17                                        | 0,80     | 0,35  | 5.700    |                         |
| » 21         | e S            | 10 38 40                                        |          |       |          |                         |
| » 21         | L              | 10 45,0                                         |          |       |          |                         |
| » 21         | M <sub>N</sub> | 10 53,5                                         |          |       |          |                         |
| » 21         | M <sub>E</sub> | 10 52,5                                         |          |       |          |                         |
| » 21         | M <sub>N</sub> | 14 48,0                                         |          |       |          |                         |
| » 21         | M <sub>E</sub> | 14 47,0                                         |          |       |          |                         |
| » 21         | M <sub>N</sub> | 20 49,0                                         |          |       |          |                         |
| » 21         | M <sub>E</sub> | 20 45,5                                         |          |       |          |                         |
| » 22         | M <sub>N</sub> | 13 13,0                                         |          |       |          |                         |
| » 22         | M <sub>E</sub> | 13 13,0                                         |          |       |          |                         |
| » 24         | e P            | 15 33 7                                         | 1,10     | 1,05  | 8.900    |                         |
| » 24         | S              | 15 43 13                                        |          |       |          |                         |
| » 24         | L              | 16 4,0                                          |          |       |          |                         |
| » 24         | M <sub>N</sub> | 16 28,5                                         |          |       |          |                         |
| » 24         | M <sub>E</sub> | 16 20,5                                         |          |       |          |                         |
| » 25         | M <sub>N</sub> | 15 4,5                                          |          |       |          |                         |
| » 25         | M <sub>E</sub> | 15 4,5                                          |          |       |          |                         |
| » 25         | P              | 19 2 52                                         | 2,50     | 2,00  | 8.500    |                         |
| » 25         | S              | 19 12 16                                        |          |       |          |                         |
| » 25         | L              | 19 26,0                                         |          |       |          |                         |
| » 25         | M <sub>N</sub> | 19 40,5                                         |          |       |          |                         |
| » 25         | M <sub>E</sub> | 19 39,5                                         |          |       |          |                         |

| Fecha         | Fase           | Hora             | AMPLITUD     |              | Δ        | Observaciones |
|---------------|----------------|------------------|--------------|--------------|----------|---------------|
|               |                |                  | N. S.        | E. W.        |          |               |
| Septiembre 26 | P              | h m s<br>3 37 22 | 0,65         | 0,45         | 2.000    |               |
|               | S              | 3 40 46          |              |              |          |               |
|               | L              | 3 41,5           |              |              |          |               |
|               | M <sub>N</sub> | 3 43,0           |              |              |          |               |
|               | M <sub>E</sub> | 3 43,5           |              |              |          |               |
| » 27          | M <sub>N</sub> | 23 16,0          |              |              |          |               |
|               | M <sub>E</sub> | 23 16,0          |              |              |          |               |
| » 30          | e (P)          | 15 41 0          | 0,50<br>0,40 | 0,30<br>0,50 | > 16.000 |               |
|               | e (S)          | 15 58 50         |              |              |          |               |
|               | L              | 16 29,0          |              |              |          |               |
|               | M <sub>N</sub> | 15 50,5          |              |              |          |               |
|               | M <sub>N</sub> | 16 31,5          |              |              |          |               |
|               | M <sub>E</sub> | 15 51,5          |              |              |          |               |
|               | M <sub>E</sub> | 16 33,0          |              |              |          |               |
| Octubre 2     | i P            | 15 41 31         | 2,25         |              | 8.950    |               |
|               | i S            | 15 51 39         |              |              |          |               |
|               | L              | 16 3,0           |              |              |          |               |
|               | M <sub>N</sub> | 16 34,0          |              |              |          |               |
| » 3           | M <sub>N</sub> | 11 14,0          |              |              |          |               |
|               | M <sub>E</sub> | 11 12,5          |              |              |          |               |
| » 3           | M <sub>N</sub> | 19 45,5          |              |              |          |               |
|               | M <sub>E</sub> | 19 45,5          |              |              |          |               |
| » 5           | M <sub>N</sub> | 6 41,0           |              |              |          |               |
|               | M <sub>E</sub> | 6 41,0           |              |              |          |               |
| » 5           | P              | 13 43 53         | 0,40         | 0,50         | 2.600    |               |
|               | (PR)           | 13 46 6          |              |              |          |               |
|               | e S            | 13 50 17         |              |              |          |               |
|               | L              | 13 54,0          |              |              |          |               |
|               | M <sub>N</sub> | 14 9,0           |              |              |          |               |
|               | M <sub>E</sub> | 14 5,5           |              |              |          |               |
|               |                |                  |              |              |          |               |
| » 7           | M <sub>N</sub> | 3 45,5           |              |              |          |               |
|               | M <sub>E</sub> | 3 38,5           |              |              |          |               |
| » 14          | (P)            | 22 33 36         | 0,65         | 0,85         | (7.900)  |               |
|               | (S)            | 22 42 52         |              |              |          |               |
|               | (PS)           | 22 43 47         |              |              |          |               |
|               | L              | 23 3             |              |              |          |               |
|               | M <sub>N</sub> | 23 15,5          |              |              |          |               |
|               | M <sub>E</sub> | 23 15,5          |              |              |          |               |
| » 16          | M <sub>N</sub> | 3 44,0           |              |              |          |               |
|               | M <sub>E</sub> | 3 44,0           |              |              |          |               |
| » 21          | M <sub>N</sub> | 3 54,5           |              |              |          |               |
|               | M <sub>E</sub> | 3 46,5           |              |              |          |               |
| » 22          | M <sub>N</sub> | 12 55,5          |              |              |          |               |
|               | M <sub>E</sub> | 12 51,0          |              |              |          |               |
| » 23          | M <sub>N</sub> | 5 44,0           |              |              |          |               |
|               | M <sub>E</sub> | 5 45,5           |              |              |          |               |
| » 23          | M <sub>N</sub> | 14 23,0          | 0,50         | 0,75         |          |               |
|               | M <sub>E</sub> | 14 28,5          |              |              |          |               |
| » 25          | i P            | 23 40 18         | 0,60         | 0,65         | 8.700    |               |
|               | i S            | 23 50 14         |              |              |          |               |
|               | M <sub>N</sub> | 24 26,0          |              |              |          |               |
|               | M <sub>E</sub> | 24 21,5          |              |              |          |               |
| » 26          | L              | 12 50,5          | 0,65         | 0,55         |          |               |
|               | M <sub>N</sub> | 13 10,0          |              |              |          |               |
|               | M <sub>E</sub> | 13 20,5          |              |              |          |               |

El Director,

*Leon Herrera*



BOLETIN SÍSMICO  
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SAN FERNANDO

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

INSTRUMENTOS

|                    | Registro. | Componen-<br>te. | Masa | Periodo | Amplifica-<br>ción. | Velocidad<br>de registro. |   | $\frac{r}{T_0^2}$ |        |
|--------------------|-----------|------------------|------|---------|---------------------|---------------------------|---|-------------------|--------|
|                    |           |                  |      |         |                     | kg                        | s |                   | m      |
| Péndulo horizontal | Milne     | Fotográfico      | N-S  | »       | 20                  | 7                         | 1 | 4                 |        |
| Idem idem          | idem      | Idem             | E-W  | »       | 20                  | 7                         | 1 | 4                 |        |
| Idem idem          | Bifilar   | Mecánico         | E-W  | 60      | 24                  | 12                        | 1 | 6                 | 0,0004 |
| Idem idem          | idem      | Idem             | N-S  | 600     | 13                  | 90                        | 1 | 15                | 0,005  |
| Idem idem          | idem      | Idem             | N-S  | 1100    | 30                  | 16                        | 1 | 15                | 0,001  |
| Idem vertical      | Idem      | Idem             | E-W  | 700     | 2                   | 270                       | 1 | 15                | 0,06   |

TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL  
(GREENWICH)

| Fecha        | Fase  | Hora            | AMPLITUD |       | $\Delta$ | Observaciones |
|--------------|-------|-----------------|----------|-------|----------|---------------|
|              |       |                 | N. S.    | E. W. |          |               |
| Noviembre 19 | $M_N$ | h m s<br>17 6,5 |          |       | km       |               |
|              | $M_E$ | 17 6,5          |          |       |          |               |
| > 20         | $M_E$ | 4 50,5          |          |       |          |               |
| > 20         | P     | 23 30 16        |          |       |          |               |
|              | S     | 23 37 8         |          |       |          |               |
|              | L     | 23 42,0         | 12,0     |       |          |               |
|              | $M_N$ | 23 52,0         |          |       |          |               |
|              | $M_E$ | 23 50,5         |          |       | 12,0     | 5.200         |
| » 22         | $M_N$ | 0 49,0          |          |       |          |               |
|              | $M_E$ | 0 38,5          |          |       |          |               |
| > 22         | P     | 13 0 20         |          |       |          |               |
|              | e S   | 13 18 34        |          |       |          |               |
|              | $M_N$ | 14 24,0         |          |       |          |               |
|              | $M_E$ | 14 20,0         |          | 1,5   | > 13.000 |               |
| » 23         | $M_N$ | 19 46,0         |          |       |          |               |
|              | $M_E$ | 19 46,0         |          |       |          |               |
| > 28         | P     | 11 17 30        |          |       |          |               |
|              | S     | 11 25 31        |          |       |          |               |
|              | L     | 11 29,0         | 0,85     |       |          |               |
|              | $M_N$ | 11 43,0         |          |       |          |               |
|              | $M_E$ | 11 44,0         |          |       | 1,50     | 6.450         |
| » 29         | $M_N$ | 19 43,5         |          |       |          |               |
|              | $M_E$ | 19 45,5         |          |       |          |               |
| Diciembre 2  | $M_N$ | 6 56,5          | 0,30     |       |          |               |
|              | $M_E$ | 6 53,5          |          | 0,45  |          |               |
| > 2          | $M_N$ | 21 22,0         | 0,75     |       |          |               |
|              | $M_E$ | 21 10,0         |          | 1,50  |          |               |
| > 4          | i S   | 19 56 39        |          |       |          |               |
| > 13         | S     | 21 46 15        |          |       |          |               |
|              | L     | 21 53,5         | 2,00     |       |          |               |
|              | $M_N$ | 22 18,5         |          |       |          |               |
|              | $M_E$ | 22 17,5         |          |       | 3,00     |               |
| > 14         | e     | 2 3 9           |          |       |          |               |
| > 14         | P     | 7 40 4          |          |       |          |               |
|              | S     | 7 47 18         |          |       |          |               |
|              | $M_E$ | 8 11,0          |          | 0,70  | 5.600    |               |
| > 15         | e P   | 7 48 4          |          |       |          |               |
|              | e S   | 7 51 45         |          |       |          |               |
|              | L     | 7 54,0          | 1,90     |       |          |               |
|              | $M_N$ | 7 58,5          |          |       |          |               |
|              | $M_E$ | 7 58,5          |          |       | 2,50     | 2.200         |

El Director,

*Luis Ferrer*