

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. |             |                                                                           |
| Enero 2 | P              | h m s<br>23 41 00 | 0,60     | 0,30  | km<br>2.380 |                                                                           |
|         | S              | 23 44 54          |          |       |             |                                                                           |
|         | M <sub>N</sub> | 23 49,5           |          |       |             |                                                                           |
|         | M <sub>E</sub> | 23 50,5           |          |       |             |                                                                           |
| » 5     | M <sub>N</sub> | 3 10,5            | 0,35     |       |             |                                                                           |
| » 6     | M <sub>E</sub> | 17 59,0           |          | 0,30  |             |                                                                           |
| » 9     | P              | 10 40 41          | 0,50     |       |             | Gráficas muy confusas. Parecen varios choques sucesivos en el mismo foco. |
|         | (PR)           | 10 42 14          |          |       |             |                                                                           |
|         | M <sub>N</sub> | 11 05,5           |          |       |             |                                                                           |
|         | M <sub>E</sub> | 11 05,5           |          |       |             |                                                                           |
| » 12    | M <sub>N</sub> | 21 38,0           |          |       |             |                                                                           |
| » 13    | M <sub>N</sub> | 17 20,0           | 0,50     | 0,30  |             |                                                                           |
|         | M <sub>E</sub> | 17 21,5           |          |       |             |                                                                           |
| » 14    | i P            | 12 16 32          |          |       | 120         |                                                                           |
|         | i S            | 12 16 44          |          |       |             |                                                                           |
| » 17    | M <sub>N</sub> | 9 30,0            | 0,45     | 0,30  |             |                                                                           |
|         | M <sub>E</sub> | 9 37,0            |          |       |             |                                                                           |
| » 18    | M <sub>N</sub> | 13 25,5           | 0,50     | 0,65  |             |                                                                           |
|         | M <sub>E</sub> | 13 25,5           |          |       |             |                                                                           |
| » 20    | e P            | 2 43 37           |          |       | (8.400)     |                                                                           |
|         | (e S)          | 2 53 17           |          |       |             |                                                                           |
| » 24    | e P            | 4 04 27           | 1,75     | 1,45  |             |                                                                           |
|         | L              | 5 06,0            |          |       |             |                                                                           |
|         | M <sub>N</sub> | 5 27,5            |          |       |             |                                                                           |
|         | M <sub>E</sub> | 5 33,0            |          |       |             |                                                                           |
| » 25    | M <sub>N</sub> | 3 44,0            | 0,30     |       |             |                                                                           |
|         | M <sub>E</sub> | 3 40,5            |          |       |             |                                                                           |
| » 27    | i P            | 19 46 05          | 0,35     | 0,25  | 2.450       |                                                                           |
|         | i S            | 19 50 05          |          |       |             |                                                                           |
|         | M <sub>N</sub> | 19 51,0           |          |       |             |                                                                           |
|         | M <sub>E</sub> | 19 51,0           |          |       |             |                                                                           |
| » 29    | i P            | 14 01 00          | 2,80     | 4,00  |             |                                                                           |
|         | (S)            | 14 13 00          |          |       |             |                                                                           |
|         | L              | 14 29,0           |          |       |             |                                                                           |
|         | M <sub>N</sub> | 15 45,0           |          |       |             |                                                                           |
|         | M <sub>E</sub> | 15 38,5           |          |       |             |                                                                           |
| » 30    | (e P)          | 3 24 38           | 0,50     | 0,30  |             |                                                                           |
|         | M <sub>N</sub> | 4 48,0            |          |       |             |                                                                           |
|         | M <sub>E</sub> | 4 45,5            |          |       |             |                                                                           |
| » 31    | M <sub>N</sub> | 12 35,5           |          |       |             |                                                                           |
|         | M <sub>E</sub> | 12 38,5           |          |       |             |                                                                           |
| » 31    | (e P)          | 16 20 52          |          |       |             |                                                                           |
|         | M <sub>N</sub> | 17 41,5           |          |       |             |                                                                           |
|         | M <sub>E</sub> | 17 44,5           |          |       |             |                                                                           |

## Mes de Febrero de 1932.

| Fecha     | Fase   | Hora                             | AMPLITUD |       | $\Delta$ | Observaciones |
|-----------|--------|----------------------------------|----------|-------|----------|---------------|
|           |        |                                  | N. S.    | E. W. |          |               |
| Febrero 1 | $M_N$  | 8 <sup>h</sup> 09,5 <sup>m</sup> | 0,30     | 0,25  | km       |               |
|           | $M_E$  | 8 13,0                           |          |       |          |               |
| » 3       | P      | 6 26 35                          | 1,50     | 1,25  | 8.000    |               |
|           | S      | 6 34 45                          |          |       |          |               |
|           | L      | 6 41,5                           |          |       |          |               |
|           | $M_N$  | 6 58,0                           |          |       |          |               |
|           | $M_E$  | 6 55,5                           |          |       |          |               |
| » 4       | $M_N$  | 13 28,5                          | 0,30     | 0,25  |          |               |
|           | $M_E$  | 13 33,0                          |          |       |          |               |
| » 5       | P      | 5 13 11                          |          |       | 180      |               |
|           | S      | 5 13 29                          |          |       |          |               |
| » 11      | $M_N$  | 12 25,0                          | 0,25     |       |          |               |
|           | $M_E$  | 12 26,0                          |          |       |          |               |
| » 12      | $M_N$  | 1 44,0                           | 0,35     | 0,20  |          |               |
|           | $M_E$  | 1 47,5                           |          |       |          |               |
| » 13      | P      | 0 3 47                           |          |       | 150      |               |
|           | S      | 0 4 03                           |          |       |          |               |
| » 15      | $M_N$  | 0 08,5                           | 0,50     | 0,35  |          |               |
|           | $M_E$  | 0 07,5                           |          |       |          |               |
| » 16      | (e S)  | 14 39 40                         | 1,25     | 0,80  |          |               |
|           | L      | 15 05,5                          |          |       |          |               |
|           | $M_N$  | 15 20,0                          |          |       |          |               |
|           | $M_E$  | 15 18,5                          |          |       |          |               |
| » 23      | (e P)  | 0 28 37                          | 2,80     | 1,70  | (7.800)  |               |
|           | (i S)  | 0 37 54                          |          |       |          |               |
|           | (i PS) | 0 38 36                          |          |       |          |               |
|           | L      | 0 51,0                           |          |       |          |               |
|           | $M_N$  | 0 59,5                           |          |       |          |               |
|           | $M_E$  | 1 05,5                           |          |       |          |               |
| » 23      | $M_N$  | 22 02,5                          | 0,35     |       |          |               |
|           | $M_E$  | 22 02,0                          |          |       |          |               |

El Director,



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

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

$a = 28^m$

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                         | 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. |          |                             |
| Marzo | i P<br>PR<br>i S<br>M <sub>N</sub><br>M <sub>E</sub>     | 2 11 31                                                         | 1,25     | 1,00  | 280      |                             |
|       |                                                          | 2 11 50                                                         |          |       |          |                             |
|       |                                                          | 2 12 00                                                         |          |       |          |                             |
|       |                                                          | 2 13,0                                                          |          |       |          |                             |
|       |                                                          | 2 13,0                                                          |          |       |          |                             |
| »     | M <sub>N</sub><br>M <sub>E</sub>                         | 13 59,0<br>13 57,0                                              |          |       |          |                             |
| »     | M <sub>N</sub><br>M <sub>E</sub>                         | 5 38,5<br>5 34,0                                                | 0,35     |       |          |                             |
| »     | P<br>L<br>M <sub>N</sub><br>M <sub>E</sub>               | 18 22 54<br>19 21,0<br>19 35,0<br>19 32,0                       | 0,70     | 0,40  |          |                             |
| »     | P                                                        | 7 4 16                                                          |          |       |          |                             |
| »     | (P)<br>M <sub>N</sub><br>M <sub>E</sub>                  | 10 21 58<br>10 31,5<br>10 33,5                                  |          |       |          |                             |
| »     | M <sub>N</sub><br>M <sub>E</sub>                         | 7 9,0<br>7 9,0                                                  |          |       |          |                             |
| »     | M <sub>N</sub><br>M <sub>E</sub>                         | 4 57,5<br>4 59,5                                                |          |       |          |                             |
| »     | (P)<br>( )<br>S<br>L<br>M <sub>N</sub><br>M <sub>E</sub> | 22 54 8<br>22 54 42<br>23 2 32<br>23 12,0<br>23 23,5<br>23 29,0 | 0,65     | 0,50  | (6.900)  |                             |
| »     | M <sub>N</sub><br>M <sub>E</sub>                         | 5 55,0<br>5 55,0                                                | 0,55     |       |          |                             |
| »     | M <sub>N</sub><br>M <sub>E</sub>                         | 22 25,0<br>22 37,0                                              |          |       |          |                             |
| »     | (S)<br>(L)<br>M <sub>N</sub><br>M <sub>E</sub>           | 5 39 33<br>5 58,0<br>6 11,5<br>6 11,0                           | 0,50     | 0,35  |          |                             |
| »     | M <sub>N</sub><br>M <sub>E</sub>                         | 12 20,0<br>12 19,5                                              | 0,45     | 0,45  |          |                             |
| »     | P<br>S<br>L<br>M <sub>N</sub><br>M <sub>E</sub>          | 0 10 37<br>0 20 37<br>0 35,0<br>0 50,5<br>0 50,5                | 3,10     | 2,50  | 8.800    |                             |
| »     | M <sub>N</sub><br>M <sub>E</sub>                         | 11 26,0<br>11 8,5                                               | 0,50     | 0,50  |          |                             |
| »     | M <sub>N</sub><br>M <sub>E</sub>                         | 1 47,0<br>1 48,0                                                |          |       |          |                             |
| »     | M <sub>N</sub><br>M <sub>E</sub>                         | 10 47,0<br>10 47,5                                              | 0,30     |       |          |                             |
| »     | P                                                        | 12 34 7                                                         |          |       |          | Movimiento local muy débil. |

Mes de Abril de 1932.

| Fecha   | Fase           | Hora                                           | AMPLITUD |       | $\Delta$ | Observaciones |
|---------|----------------|------------------------------------------------|----------|-------|----------|---------------|
|         |                |                                                | N. S.    | E. W. |          |               |
| Abril 3 | (S)            | <sup>h</sup> 21 <sup>m</sup> 9 <sup>s</sup> 12 | 0,55     | 0,40  | km       |               |
|         | M <sub>N</sub> | 22 25,5                                        |          |       |          |               |
|         | M <sub>E</sub> | 22 21,0                                        |          |       |          |               |
| » 13    | (P)            | 0 12 33                                        |          |       |          |               |
|         | L              | 1 13,0                                         |          |       |          |               |
|         | M <sub>N</sub> | 1 26,5                                         |          |       |          |               |
|         | M <sub>E</sub> | 1 25,5                                         |          |       |          |               |
| » 14    | L              | 1 52,0                                         | 0,85     | 0,70  |          |               |
|         | M <sub>N</sub> | 1 54,0                                         |          |       |          |               |
|         | M <sub>E</sub> | 1 54,5                                         |          |       |          |               |
| » 22    | M <sub>N</sub> | 6 16,5                                         |          |       |          |               |
|         | M <sub>E</sub> | 6 16,0                                         |          |       |          |               |
| » 24    | M <sub>N</sub> | 7 6,5                                          | 0,40     |       |          |               |
|         | M <sub>E</sub> | 6 57,0                                         |          |       |          |               |
| » 26    | (P)            | 8 7 26                                         | 0,50     |       | (10.100) |               |
|         | PS             | 8 18 30                                        |          |       |          |               |
|         | M <sub>N</sub> | 8 49,0                                         |          |       |          |               |
|         | M <sub>E</sub> | 8 50,0                                         |          |       |          |               |
| » 29    | M <sub>N</sub> | 19 11,0                                        |          | 0,35  |          |               |
|         | M <sub>E</sub> | 19 19,0                                        |          |       |          |               |
| » 30    | (e P)          | 1 14 19                                        |          |       | (4.600)  |               |
|         | S              | 1 20 39                                        |          |       |          |               |
|         | L              | 1 29,0                                         |          |       |          |               |

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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              |

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(GREENWICH)

| Fecha | Fase | Hora                                                           | AMPLITUD                                                                   |       | $\Delta$ | Observaciones |
|-------|------|----------------------------------------------------------------|----------------------------------------------------------------------------|-------|----------|---------------|
|       |      |                                                                | N. S.                                                                      | E. W. |          |               |
| Mayo  | I    | h m s                                                          |                                                                            |       | km       |               |
|       |      | 5 58,5                                                         |                                                                            |       |          |               |
|       |      | 5 58,0                                                         |                                                                            |       |          |               |
| »     | 3    | M <sub>N</sub><br>M <sub>E</sub>                               | 0 39,0<br>0 31,0                                                           |       |          |               |
| »     | 5    | M <sub>N</sub><br>M <sub>E</sub>                               | 10 14,5<br>10 10,0                                                         | 0,30  |          |               |
| »     | 6    | M <sub>N</sub><br>M <sub>E</sub>                               | 5 21,5<br>5 21,5                                                           |       |          |               |
| »     | 14   | e P<br>i PR<br>i PR<br>i S<br>M <sub>N</sub><br>M <sub>E</sub> | 13 26 24<br>13 31 36<br>13 35 22<br>13 38 26<br>13 49,0<br>13 47,5         | 6,80  | 6,25     | > 11.000      |
| »     | 18   | M <sub>N</sub><br>M <sub>E</sub>                               | 20 9,0<br>20 9,5                                                           |       | 0,75     |               |
| »     | 21   | P<br>i S<br>L<br>M <sub>N</sub><br>M <sub>E</sub>              | 10 21 57<br>10 31 30<br>10 45,0<br>10 55,5<br>10 49,0                      | 1,75  | 2,00     | 8.300         |
| »     | 21   | M <sub>N</sub><br>M <sub>E</sub>                               | 16 10,5<br>16 10,0                                                         | 0,30  |          |               |
| »     | 22   | M <sub>N</sub><br>M <sub>E</sub>                               | 3 55,0<br>3 54,0                                                           |       |          |               |
| »     | 22   | (P)<br>L<br>M <sub>N</sub><br>M <sub>E</sub>                   | 12 50 10<br>12 59,0<br>13 8,0<br>13 2,0                                    | 0,70  | 0,50     |               |
| »     | 26   | P<br>PR<br>(S)<br>PS<br>L<br>M <sub>N</sub><br>M <sub>E</sub>  | 16 28 49<br>16 36 48<br>16 43 10<br>16 45 00<br>17 5,0<br>17 8,5<br>17 7,0 | 2,75  | 2,75     | > 11.000      |
| »     | 28   | P<br>L<br>M <sub>N</sub><br>M <sub>E</sub>                     | 2 40 6<br>3 17,0<br>3 32,5<br>3 22,0                                       | 1,40  | 1,05     |               |
| »     | 31   | M <sub>N</sub><br>M <sub>E</sub>                               | 9 5,0<br>9 7,0                                                             | 0,30  |          |               |

Mes de Junio de 1932.

|       |   |                                                      |                                                                |        |        |       |  |
|-------|---|------------------------------------------------------|----------------------------------------------------------------|--------|--------|-------|--|
| Junio | 3 | P<br>P<br>S<br>L<br>M <sub>N</sub><br>M <sub>E</sub> | 10 49 33<br>10 49 50<br>11 0 30<br>11 26<br>11 31,5<br>11 33,0 | > 13,0 | > 14,5 | 9.600 |  |
|       |   | M <sub>N</sub><br>M <sub>E</sub>                     | 18 50,0<br>18 50,0                                             |        |        |       |  |

| Fecha | Fase | Hora                                                | AMPLITUD |       | Δ    | Observaciones |
|-------|------|-----------------------------------------------------|----------|-------|------|---------------|
|       |      |                                                     | N. S.    | E. W. |      |               |
| Junio | 3    | M <sub>N</sub><br>M <sub>E</sub>                    | h m s    |       |      | km            |
|       |      |                                                     | 21 7,0   |       |      |               |
|       |      | 21 6,5                                              |          |       |      |               |
| »     | 4    | M <sub>N</sub><br>M <sub>E</sub>                    | 3 6,0    |       |      |               |
|       |      |                                                     | 2 59,0   |       |      |               |
| »     | 5    | (S)<br>M <sub>N</sub><br>M <sub>E</sub>             | 9 28,0   |       |      |               |
|       |      |                                                     | 9 59,5   |       |      |               |
|       |      |                                                     | 9 59,5   |       |      |               |
| »     | 6    | i S<br>L<br>M <sub>N</sub><br>M <sub>E</sub>        | 9 7 36   | 0,90  | 0,75 |               |
|       |      |                                                     | 9 23,0   |       |      |               |
|       |      |                                                     | 9 33,0   |       |      |               |
|       |      |                                                     | 9 38,5   |       |      |               |
| »     | 10   | M <sub>N</sub><br>M <sub>E</sub>                    | 21 35,0  |       |      |               |
|       |      |                                                     | 21 33,5  |       |      |               |
| »     | 11   | M <sub>N</sub><br>M <sub>E</sub>                    | 9 6,5    |       |      |               |
|       |      |                                                     | 9 6,5    |       |      |               |
| »     | 11   | M <sub>N</sub><br>M <sub>E</sub>                    | 18 21,5  |       |      |               |
|       |      |                                                     | 18 15,0  |       |      |               |
| »     | 13   | L<br>M <sub>N</sub><br>M <sub>E</sub>               | 21 56,5  | 0,45  | 0,40 |               |
|       |      |                                                     | 22 8,0   |       |      |               |
|       |      |                                                     | 21 58,5  |       |      |               |
| »     | 14   | M <sub>N</sub><br>M <sub>E</sub>                    | 7 8,0    |       |      |               |
|       |      |                                                     | 7 2,0    |       |      |               |
| »     | 16   | (P)<br>(S)<br>L<br>M <sub>N</sub><br>M <sub>E</sub> | 1 29 41  |       |      |               |
|       |      |                                                     | 1 43 35  |       |      |               |
|       |      |                                                     | 2 9,5    |       |      |               |
|       |      |                                                     | 2 20,0   |       |      |               |
|       |      |                                                     | 2 21,0   |       |      | > 11.000      |
| »     | 18   | P<br>S<br>L<br>M <sub>E</sub>                       | 10 24 51 |       |      |               |
|       |      |                                                     | 10 36 7  |       |      |               |
|       |      |                                                     | 10 58    |       |      |               |
|       |      |                                                     | 11 6,5   |       |      | 10.400        |
| »     | 18   | M <sub>N</sub><br>M <sub>E</sub>                    | 22 10,0  |       |      |               |
|       |      |                                                     | 22 16,0  |       | 0,45 |               |
| »     | 20   | M <sub>N</sub><br>M <sub>E</sub>                    | 5 22,0   |       |      |               |
|       |      |                                                     | 5 22,0   |       |      |               |
| »     | 20   | M <sub>N</sub><br>M <sub>E</sub>                    | 6 51,5   | 0,30  |      |               |
|       |      |                                                     | 6 52,5   |       | 0,35 |               |
| »     | 20   | M <sub>N</sub><br>M <sub>E</sub>                    | 10 16,0  | 0,30  |      |               |
|       |      |                                                     | 10 15,0  |       | 0,30 |               |
| »     | 20   | M <sub>N</sub><br>M <sub>E</sub>                    | 20 37,0  |       |      |               |
|       |      |                                                     | 20 35,0  |       |      |               |
| »     | 21   | M <sub>N</sub><br>M <sub>E</sub>                    | 5 21,0   |       |      |               |
|       |      |                                                     | 5 31,0   |       |      |               |
| »     | 22   | M <sub>N</sub><br>M <sub>E</sub>                    | 1 43,5   |       |      |               |
|       |      |                                                     | 1 42,0   |       |      |               |
| »     | 22   | P<br>S<br>L<br>M <sub>N</sub><br>M <sub>E</sub>     | 13 12 24 | 2,25  | 1,75 | 9.350         |
|       |      |                                                     | 13 22 51 |       |      |               |
|       |      |                                                     | 13 44,5  |       |      |               |
|       |      |                                                     | 13 55,0  |       |      |               |
|       |      |                                                     | 13 55,5  |       |      |               |
| »     | 23   | M <sub>N</sub><br>M <sub>E</sub>                    | 3 58,5   |       |      |               |
|       |      |                                                     | 4 3,5    |       |      |               |
| »     | 26   | M <sub>N</sub><br>M <sub>E</sub>                    | 20 23,5  | 0,45  |      |               |
|       |      |                                                     | 20 24,5  |       | 0,30 |               |
| »     | 29   | M <sub>N</sub><br>M <sub>E</sub>                    | 2 48,0   |       |      |               |
|       |      |                                                     | 2 48,0   |       |      |               |
| »     | 29   | M <sub>N</sub><br>M <sub>E</sub>                    | 19 16,0  | 0,25  |      |               |
|       |      |                                                     | 19 14,0  |       | 0,30 |               |

rector,

*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. | Componente. | Masa | Periodo | Amplificación. | Velocidad 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 2 | $M_N$ | h m s<br>3 47,0 |          |         | km       |               |
|         | $M_E$ | 3 30,5          |          |         |          |               |
| » 2     | $M_N$ | 12 20,5         |          |         |          |               |
|         | $M_E$ | 12 20,0         |          |         |          |               |
| » 5     | $M_N$ | 12 5,5          |          |         |          |               |
|         | $M_E$ | 12 4,5          |          |         |          |               |
| » 7     | (P)   | 16 28 27        |          |         | (9.500)  |               |
|         | S     | 16 39 1         |          |         |          |               |
|         | L     | 16 54,0         |          |         |          |               |
|         | $M_N$ | 17 8,5          | 6,00     |         |          |               |
|         | $M_E$ | 17 9,0          | 3,70     |         |          |               |
| » 9     | $M_N$ | 13 49,0         |          |         |          |               |
|         | $M_E$ | 13 50,0         |          |         |          |               |
| » 10    | $M_N$ | 8 53,5          | 0,35     |         |          |               |
|         | $M_E$ | 8 41,5          |          | 0,30    |          |               |
| » 12    | e P   | 19 36 53        |          |         | 3,0      |               |
|         | i S   | 19 47 23        |          |         |          |               |
|         | L     | 20 3,0          |          |         |          |               |
|         | $M_N$ | 20 12,5         |          | 2,6     |          |               |
|         | $M_E$ | 20 13,0         |          |         |          |               |
| » 20    | (S)   | 20 37 16        |          |         |          |               |
|         | $M_N$ | 21 47,0         |          |         |          |               |
|         | $M_E$ | 21 47,0         |          |         |          |               |
| » 21    | $M_N$ | 14 43,0         |          |         |          |               |
|         | $M_E$ | 14 47,0         |          |         |          |               |
| » 21    | $M_N$ | 17 46,5         |          |         |          |               |
|         | $M_E$ | 17 52,0         |          |         |          |               |
| » 25    | (P)   | 9 25 33         |          |         | 2,75     |               |
|         | i S   | 9 35 58         |          |         |          |               |
|         | L     | 9 58,0          |          |         |          |               |
|         | $M_N$ | 10 7,0          |          | 3,40    |          |               |
|         | $M_E$ | 10 7,0          |          | (9.300) |          |               |
| » 27    | $M_N$ | 22 40,0         |          |         |          |               |
|         | $M_E$ | 22 37,5         |          |         |          |               |

Mes de Agosto de 1932.

|          |       |         |  |  |      |  |
|----------|-------|---------|--|--|------|--|
| Agosto 1 | $M_N$ | 11 11,0 |  |  |      |  |
|          | $M_E$ | 10 10,5 |  |  |      |  |
| » 2      | $M_N$ | 5 47,0  |  |  |      |  |
|          | $M_E$ | 5 38,0  |  |  |      |  |
| » 5      | $M_N$ | 21 33,5 |  |  |      |  |
|          | $M_E$ | 21 33,5 |  |  |      |  |
| » 10     | $M_N$ | 17 20,5 |  |  |      |  |
|          | $M_E$ | 17 23,5 |  |  |      |  |
| » 11     | $M_N$ | 10 40,0 |  |  |      |  |
|          | $M_E$ | 10 40,0 |  |  |      |  |
| » 12     | S     | 3 47 40 |  |  | 3,75 |  |
|          | $M_N$ | 4 21,0  |  |  |      |  |
|          | $M_E$ | 4 22,5  |  |  |      |  |

| Fecha     | Fase  | Hora             | AMPLITUD |       | $\Delta$ | Observaciones |
|-----------|-------|------------------|----------|-------|----------|---------------|
|           |       |                  | N. S.    | E. W. |          |               |
| Agosto 13 | $M_N$ | h m s<br>22 46,0 | 0,95     | 0,80  | km       |               |
|           | $M_E$ | 22 45,5          |          |       |          |               |
| » 14      | e P   | 4 52 I           | 1,15     | 1,15  | 8.800    |               |
|           | i S   | 5 I 59           |          |       |          |               |
|           | L     | 5 24,0           |          |       |          |               |
|           | $M_N$ | 5 40,0           |          |       |          |               |
|           | $M_E$ | 5 30,5           |          |       |          |               |
| » 21      | $M_N$ | 5 24,0           | 0,85     |       |          |               |
|           | $M_E$ | 5 24,5           |          | 1,00  |          |               |
| » 22      | $M_N$ | 12 12,0          | 0,50     |       |          |               |
|           | $M_E$ | 12 7,5           |          | 1,35  |          |               |

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. | Componente. | Masa | Periodo | Amplificación. | Velocidad de registro. | $\frac{r}{T_0^2}$ |        |
|--------------------|----------|-------------|-----------|-------------|------|---------|----------------|------------------------|-------------------|--------|
|                    |          |             |           |             | kg   | s       |                | m mm                   |                   |        |
| Péndulo horizontal | Milne    | Fotográfico | N-S       | »           | 20   | 7       | 1              | 4                      |                   |        |
| 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   |

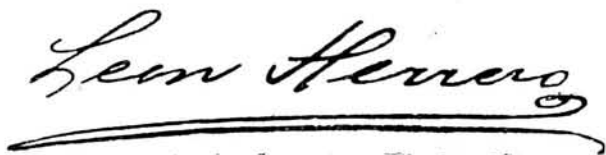
## TIEMPO MEDIO CIVIL DE EUROPA OCCIDENTAL

(GREENWICH)

| Fecha        | Fase  | Hora            | AMPLITUD |       | $\Delta$ | Observaciones |
|--------------|-------|-----------------|----------|-------|----------|---------------|
|              |       |                 | N. S.    | E. W. |          |               |
| Septiembre 3 | $M_N$ | h m s<br>13 4,0 | 1,50     | 0,80  | km       |               |
|              | $M_E$ | 13 3,0          |          |       |          |               |
| » 4          | $M_N$ | 20 50,0         |          |       |          |               |
|              | $M_E$ | 20 51,0         |          |       |          |               |
| » 8          | e (P) | 1 54 2          | 0,45     | 0,65  | (9.250)  |               |
|              | e (S) | 2 4 25          |          |       |          |               |
|              | L     | 2 32,0          |          |       |          |               |
|              | $M_N$ | 2 35,5          |          |       |          |               |
|              | $M_E$ | 2 35,5          |          |       |          |               |
| » 8          | $M_N$ | 7 58,0          |          | 0,25  |          |               |
|              | $M_E$ | 8 4,0           |          |       |          |               |
| » 8          | $M_N$ | 15 30,0         |          |       |          |               |
|              | $M_E$ | 15 30,0         |          |       |          |               |
| » 9          | $M_N$ | 15 14,5         |          |       |          |               |
|              | $M_E$ | 15 14,5         |          |       |          |               |
| » 11         | $M_N$ | 14 56,5         | 0,25     |       |          |               |
|              | $M_E$ | 14 57,0         |          |       |          |               |
| » 12         | $M_N$ | 8 2,0           | 0,30     |       |          |               |
|              | $M_E$ | 8 2,5           |          |       |          |               |
| » 14         | $M_E$ | 9 25,0          |          |       |          |               |
| » 15         | $M_N$ | 12 20,5         |          | 0,35  |          |               |
|              | $M_E$ | 12 24,5         |          |       |          |               |
| » 15         | e P   | 14 15 03        | 3,00     | 2,00  | > 15.000 |               |
|              | S     | 14 27 47        |          |       |          |               |
|              | L     | 15 5,0          |          |       |          |               |
|              | $M_N$ | 15 38,5         |          |       |          |               |
|              | $M_E$ | 15 45,5         |          |       |          |               |
| » 23         | P     | 14 34 54        | 1,10     | 1,25  | 9.000    |               |
|              | S     | 14 45 04        |          |       |          |               |
|              | i PS  | 14 45 41        |          |       |          |               |
|              | L     | 14 57,5         |          |       |          |               |
|              | $M_N$ | 15 20,5         |          |       |          |               |
| » 25         | $M_N$ | 23 23,0         |          |       |          |               |
|              | $M_E$ | 23 23,5         |          |       |          |               |
| » 26         | (P)   | 19 26 00        | 10,00    | 9,20  | 2.550    |               |
|              | P     | 19 26 16        |          |       |          |               |
|              | S     | 19 30 18        |          |       |          |               |
|              | $M_N$ | 19 36,0         |          |       |          |               |
|              | $M_E$ | 19 37,0         |          |       |          |               |
| » 26         | P     | 21 32 14        | 0,45     | 0,50  | 2.550    |               |
|              | S     | 21 36 22        |          |       |          |               |
|              | PS    | 21 36 44        |          |       |          |               |
|              | $M_N$ | 21 42,5         |          |       |          |               |
|              | $M_E$ | 21 43,5         |          |       |          |               |
| » 28         | P     | 16 57 26        |          | 0,35  | 2.550    |               |
|              | i S   | 17 1 34         |          |       |          |               |
|              | $M_E$ | 17 7,0          |          |       |          |               |
| » 29         | P     | 4 2 30          | 1,00     |       | 2.600    |               |
|              | PR    | 4 3 08          |          |       |          |               |
|              | i S   | 4 6 43          |          |       |          |               |
|              | L     | 4 10,5          |          |       |          |               |
|              | $M_N$ | 4 14,5          |          |       |          |               |

| Fecha         | Fase  | Hora             | AMPLITUD |       | $\Delta$ | Observaciones |
|---------------|-------|------------------|----------|-------|----------|---------------|
|               |       |                  | N. S.    | E. W. |          |               |
| Septiembre 29 | $M_N$ | h m s<br>14 46,0 |          |       | km       |               |
|               | $M_E$ | 14 48,0          |          |       |          |               |
| » 29          | S     | 18 10 36         | 0,55     | 0,35  |          |               |
|               | $M_N$ | 18 53,5          |          |       |          |               |
|               | $M_E$ | 18 48,5          |          |       |          |               |
| Octubre 1     | $M_N$ | 9 43,5           |          |       |          |               |
|               | $M_E$ | 9 43,5           |          |       |          |               |
| » 2           | S     | 3 20 54          | 2,25     | 1,40  |          |               |
|               | L     | 3 35,0           |          |       |          |               |
|               | $M_N$ | 3 49,5           |          |       |          |               |
|               | $M_E$ | 3 39,0           |          |       |          |               |
| » 9           | $M_N$ | 6 40,5           |          |       |          |               |
|               | $M_E$ | 6 41,0           |          |       |          |               |
| » 11          | $M_N$ | 19 59,0          |          |       |          |               |
|               | $M_E$ | 19 59,0          |          |       |          |               |
| » 16          | P     | 12 20 24         |          |       | 9.700    |               |
|               | S     | 12 31 8          |          |       |          |               |
|               | (PS)  | 12 31 40         |          |       |          |               |
| » 17          | (S)   | 13 45 24         |          |       |          |               |
|               | $M_N$ | 15 19,5          |          |       |          |               |
|               | $M_E$ | 15 20,0          |          |       |          |               |
| » 20          | $M_N$ | 19 15,0          |          |       |          |               |
|               | $M_E$ | 19 17,5          |          |       |          |               |
| » 23          | P     | 13 43 00         |          |       | 3.080    |               |
|               | S     | 13 47 48         |          |       |          |               |
|               | $M_N$ | 13 57,0          |          |       |          |               |
| » 23          | $M_N$ | 22 36,0          | 0,90     |       |          |               |
|               | $M_E$ | 22 36,5          |          | 0,30  |          |               |
| » 29          | (P)   | 11 20 12         | 0,35     | 0,35  | (5.350)  |               |
|               | (S)   | 11 27 12         |          |       |          |               |
|               | $M_N$ | 11 47,5          |          |       |          |               |
|               | $M_E$ | 11 47,5          |          |       |          |               |
| » 30          | P     | 20 59 34         | 1,55     | 0,90  | 9.500    |               |
|               | S     | 21 10 10         |          |       |          |               |
|               | $M_N$ | 21 41,5          |          |       |          |               |
|               | $M_E$ | 21 42,0          |          |       |          |               |

El Director,



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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. | Componento. | Masa<br>kg | Periodo<br>s | Amplificación. | Velocidad de registro. |    | $\frac{r}{T_0^2}$ |        |
|--------------------|-----------|-------------|------------|--------------|----------------|------------------------|----|-------------------|--------|
|                    |           |             |            |              |                | m                      | mm |                   |        |
| Péndulo horizontal | Milne     | Fotográfico | N-S        | 20           | 7              | 1                      | 4  |                   |        |
| Idem               | idem      | Idem        | E-W        | 20           | 7              | 1                      | 4  |                   |        |
| Idem               | idem      | Bifilar     | Mecánico   | E-W          | 60             | 12                     | 1  | 6                 | 0,0004 |
| Idem               | idem      | Idem        | N-S        | 600          | 13             | 90                     | 1  | 15                | 0,005  |
| 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. |          |               |
| Noviembre 1 | P              | 16 25 07 | 0,65     | 0,35  | 2.600    |               |
|             | S              | 16 29 20 |          |       |          |               |
|             | M <sub>N</sub> | 16 35,5  |          |       |          |               |
|             | M <sub>E</sub> | 16 34,0  |          |       |          |               |
| » 2         | M <sub>N</sub> | 12 15,0  |          |       |          |               |
|             | M <sub>E</sub> | 12 15,0  |          |       |          |               |
| » 13        | P              | 4 59 28  | 1,30     | 0,75  | 9.060    |               |
|             | i PR           | 5 3 28   |          |       |          |               |
|             | i S            | 5 9 42   |          |       |          |               |
|             | L              | 5 23,0   |          |       |          |               |
|             | M <sub>N</sub> | 5 48,5   |          |       |          |               |
|             | M <sub>E</sub> | 5 30,0   |          |       |          |               |
| » 17        | M <sub>N</sub> | 6 57,5   | 0,50     |       |          |               |
|             | M <sub>E</sub> | 6 57,0   |          | 0,50  |          |               |
| » 26        | (P)            | 4 38 51  | 0,65     | 0,75  | (8.350)  |               |
|             | PR             | 4 42 5   |          |       |          |               |
|             | S              | 4 48 22  |          |       |          |               |
|             | M <sub>N</sub> | 5 27,0   |          |       |          |               |
|             | M <sub>E</sub> | 5 22,5   |          |       |          |               |
| » 26        | M <sub>N</sub> | 18 4,5   |          |       |          |               |
|             | M <sub>E</sub> | 18 6,0   |          |       |          |               |
| » 29        | e (P)          | 11 21 28 | 0,90     | 0,40  |          |               |
|             | S              | 11 34 28 |          |       |          |               |
|             | M <sub>N</sub> | 12 9,0   |          |       |          |               |
|             | M <sub>E</sub> | 12 8,5   |          |       |          |               |
| Diciembre 4 | e P            | 4 9 25   | 1,00     | 2,75  | 2.850    |               |
|             | PR             | 4 9 44   |          |       |          |               |
|             | i S            | 4 13 57  |          |       |          |               |
|             | M <sub>N</sub> | 4 14,5   |          |       |          |               |
|             | M <sub>E</sub> | 4 17,0   |          |       |          |               |
| » 4         | (PR)           | 8 41 05  |          |       | >13.000  |               |
|             | (S)            | 8 45 54  |          |       |          |               |
|             | L              | 9 10,5   |          |       |          |               |
|             | M <sub>N</sub> | 9 31,0   |          |       |          |               |
|             | M <sub>E</sub> | 9 16,0   |          |       |          |               |
| » 7         | P              | 16 35 04 | 3,25     | 3,85  | 9.360    |               |
|             | i S            | 16 45 32 |          |       |          |               |
|             | L              | 17 6,0   |          |       |          |               |
|             | M <sub>N</sub> | 17 17,0  |          |       |          |               |
|             | M <sub>E</sub> | 17 16,5  |          |       |          |               |
| » 9         | M <sub>N</sub> | 9 33,0   |          |       |          |               |
|             | M <sub>E</sub> | 9 32,0   |          |       |          |               |
| » 10        | M <sub>N</sub> | 12 7,5   |          |       |          |               |
|             | M <sub>E</sub> | 12 8,0   |          |       |          |               |
| » 15        | M <sub>N</sub> | 20 42,5  |          |       |          |               |
| » 21        | P              | 6 22 16  | 8,75     | 15,00 | 9.450    |               |
|             | S              | 6 32 48  |          |       |          |               |
|             | L              | 6 48,0   |          |       |          |               |
|             | M <sub>N</sub> | 7 03,0   |          |       |          |               |
|             | M <sub>E</sub> | 6 54,0   |          |       |          |               |

| Fecha        | Fase           | Hora            | AMPLITUD |       | $\Delta$ | Observaciones |
|--------------|----------------|-----------------|----------|-------|----------|---------------|
|              |                |                 | N. S.    | E. W. |          |               |
| Diciembre 24 | L              | h m s<br>7 42,5 | 0,80     | 1,20  | km       |               |
|              | M <sub>N</sub> | 7 59,0          |          |       |          |               |
|              | M <sub>E</sub> | 7 57,5          |          |       |          |               |
| » 25         | P              | 2 16 17         |          | 15,50 | 8.300    |               |
|              | S              | 2 25 51         |          |       |          |               |
|              | M <sub>N</sub> | 2 54,0          |          |       |          |               |
|              | M <sub>E</sub> | 2 52,5          |          |       |          |               |
| » 31         | S              | 6 52 11         | 5,00     | 6,50  |          |               |
|              | L              | 7 7,0           |          |       |          |               |
|              | M <sub>N</sub> | 7 12,5          |          |       |          |               |
|              | M <sub>E</sub> | 7 12,5          |          |       |          |               |

El Director,

*Leon Alvarez*