Aftershock sequences of some large earthquakes in the region of Greece

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Riassunto. — Vengono qui studiate dagli A. le caratteristiche delle deformazioni, la magnitudo e la distribuzione dei tempi delle repliche dei grandi terremoti avvenuti in Grecia dal 1926 al 1964. Sono state trovate relazioni approssimative fra il numero delle repliche, la magnitudo e la profondità focale della scossa principale, e fra la magnitudo della replica più forte e la magnitudo e profondità focale della scossa principale.

La replica più forte avviene entro quattordici giorni dalla scossa principale; in molti casi « ultime repliche » forti si hanno uno o più mesi dopo le scossa principale. Nel 40% dei casi la magnitudo di una o più scosse premonitrici è maggiore di 3,5; la probabilità che un terremoto sia preceduto da una forte scossa premonitrice non molto più piccola di quella principale è del 10%.

Viene dimostrato che dallo studio della distribuzione della magnitudo e delle caratteristiche delle deformazioni delle repliche, si possono dedurre alcune proprietà dei materiali terrestri che si trovano nella regione delle repliche prese in esame.

Summary. — Deformation characteristics, magnitude and time distribution of the aftershocks of the large earthquakes, occurred in the region of Greece from 1926 till 1964 are investigated. An approximate relation between the number of aftershocks and the magnitude and focal depth of the main shock has been found. Also, an approximate relation has been derived between the magnitude of the largest aftershock and the magnitude and focal depth of the main shok. The largest aftershock occurs within fourteen days after the main shock. In many cases large " late aftershocks " occur one or more months after the main shock. One or more foreshocks of magnitude larger than 3.5 occurred in forty per cent of the cases. The probability for an earthquake to be preceded by a large foreshock not much smaller than the main shock is 10%. It is shown that some properties of the Earth's material in the aftershock region can be derived by studying the magnitude distribution and deformation characteristics of the aftershocks.

Introduction.

It is well known that the earthquakes have a tendency to occur at certain space domains. There is also a tendency of the earthquake activity to concentrate in time. Terms like "seismic zone" and "seismic period" related to these properties of earthquake occurrence have been used by seismologists. Very frequently, series of earthquakes occur in a relatively small space and short time.

A single large earthquake is usually preceded and followed in short time by other earthquakes of considerably smaller magnitude than the large one. These small shocks have their foci near the focus of the large earthquake. The conspicuously larger earthquake of the series is called *main or principal shock* and the earthquakes preceding and following the main shock are called *fore- and aftershocks* respectively. The whole series is called *foreshock-aftershock sequence.* There are cases when a series of earthquakes occurs in a small space and short time but no one of these shocks is conspicuously larger. Such a series is usually called *swarm* of earthquakes.

In this paper we shall investigate the foreshock and mainly the aftershock sequences all of the normal earthquakes (focal depth smaller than about 70 km) of magnitude $M \geqq 6$ occurred in the region of and near Greece from 1926 till 1964. The region is bordered by the 34° N and 42° N parallels and 19° E and 29° E meridians. The study includes the time and magnitude distribution of the aftershocks, the deformation characteristics and some properties of the material in the space domain of several aftershock sequences.

The study of fore- and aftershock sequences is very usefull for many purposes. Investigations of this kind can contribute to the problem of earthquake prediction. Formulas [40], [41], [45] and [46], for example, can be used to determine approximately the magnitude of the largest aftershock and the number of aftershocks with $M \geqq 4$ which will follow an earthquake of normal depth when the magnitude and the focal depth of the main shock is known. Also, the tendency of foreshocks to procede large earthquakes that originate from a certain region may be used to predict earthquakes in those regions. Aftershocks of the artificial explosions probably differ from aftershocks of natural seismic events in their time and spacial distribution. Study of these distribution can be used to distinguish between natural and artificial seismic events. The difference in magnitudes of the main shock and the largest aftershock might be used additionally for detection of artificial events. Deformation and stress characteristics of the aftershock volume and characteristics of magnitude distributions can be used to investigate some poperties of the earth's material in the aftershock region.

The Seismological Institute of the National Observatory of Athens in cooperation with the Seismological Laboratory of the University of Athens has undertaken a program to study the foreshock and aftershock sequences in the region of Greece under terms of a contract between our Seismological Institute and the U.S. Air Force. Since this is the first paper on this program we shall give a brief review of the results of some of the basic works on this problem.

Time Distribution of Aftershocks.

The time distribution of aftershocks have been studied by many, mainly Japanese, investigators. The original Omori's law was modified by Utsu ([15]) into:

$$n(t)\,dt = K\,(t + C)^{-h}\,dt \qquad [1]$$

where t is the time after the main shock, $n(t)\,dt$ is the number of aftershocks occurring in the time between t and $(t+dt)$ and K, C and h constants chosen to fit the data. When $h = 1$, the equation [1] expresses the Omori's law.

Mogi ([6]) showed that the time distribution of aftershocks in the early stage, when the stress probably decreases, is expressed by the relation:

$$n(t)\,dt = n_1\,t^{-h}\,dt \qquad 0 < t < t_o \qquad [2]$$

while in the late stage, when the stress remains constant, is approximated by the formula:

$$n(t)\,dt = n_2\,e^{-pt}\,dt \qquad t > t_o\ . \qquad [3]$$

He found that h is independent of the magnitude of the main shock and it shows a spacial distribution. Its value probably depends on the viscosity of the material in the aftershock region.

The frequency function of the time interval between successive earthquakes has been also investigated by several seismologists (Mogi (7), Suzuki et al. (14)). The relation

$$n(\tau)\, d(\tau) = A e^{-\lambda\tau}\, d\tau \qquad [4]$$

is applied in ordinary earthquakes, and the relation

$$n(\tau)\, d\tau = a\tau^{-\beta}\, d\tau \qquad [5]$$

in aftershock sequences. τ is the time interval between successive earthquakes and A, λ, a, and β are constants. β and the constant h in [2] are related with

$$\beta = 2 - \frac{1}{h}\,.$$

All large earthquakes of normal focal depth have aftershocks. The number of aftershocks above a fixed magnitude level, as we shall see later, depends on the magnitude of the main shock and on the depth, *i.e.* on the mechanical structure of the material in the focal region. On this ground one might expect that all large aftershocks have their own aftershocks. These shocks are called second order aftershocks. The rule however, is that no aftershocks of the second order are often experienced (Matuzawa (5)). In rare cases aftershocks of large aftershocks exist or can be distinguished.

There are cases when one or more large shocks occur in one or a few months after the main shock when aftershocks have subsided. Following Richter (13) whe shall call these shocks large " late aftershocks ". They usually have their own aftershocks. It is not always known whether they are real aftershocks or not. But we shall see more about that later.

Spacial Distribution of Foreshocks and Aftershocks.

The main shock is not situation in the center of the active segment but close to one end. In all big earthquakes which occurred in Japan from 1923 till 1964 and had many aftershocks this phenomenon has been observed (Matuzawa (5)). The domain of the epicentres of aftershocks takes approximately an elliptical form with the long axis parallel to the active fault segment. The epicenters of the aftershocks are usually concentrated near the two ends and the epicenter of the largest aftershock is close to one end but in the opposite side of the epicenter of the main shock (Richter (13)). The area S (in cm^2)

covered by the epicenters of the aftershocks is roughly given, according Bath and Duda (1), by the relation:

$$\log S = 4.95 + 1.21\, M\ . \qquad [6]$$

The aftershock volume V (in cm^3), according to the same writers, is given by the relation:

$$\log V = 9.58 + 1.47\, M \qquad [7]$$

where M is the magnitude of the main shock.

The problem of the space distribution of foreshocks has not been fully investigated yet. In some cases the epicenters of the foreshocks are close to the epicenter of the main shock but in the opposite directions of the place where the subsequent faulting takes place (Richter (13)).

Frequency Function of the Magnitude of Eearthquakes.

The frequency function of the maximum trace amplitude a of earthquakes recorded at an observatory is expressed in most cases by the known Ishimoto-Iida's statistical relation:

$$n(a)\, da = ka^{-m}\, da \qquad [8]$$

where $n(a)da$ is the number of earthquakes confined to a certain domain and recorded with maximum amplitudes between a and $(a + da)$, and k, m, are constants. Gutenberg and Richter (4) used the form:

$$\log n\,(M) = A + b\,(8 - M) \qquad [9]$$

to express the frequency function of the magnitude M of the earthquakes originated from a certain space domain. The $n(M)\,dM$ is the number of earthquakes with magnitudes between M and $(M + dM)$ and A and b are constants.

Since $M \simeq \log a$ for epicentral distance equal to 100 km and $da = a\, dM$, it can be shown that the constants m and b in the formulas [8] and [9] are related by the:

$$b = m - 1\ . \qquad [10]$$

The relations [8] and [9] hold also for aftershock and foreshock sequences but the value of constant b is higher by about 0.3 for aftershocks than for foreshocks or other earthquakes of the same region (Mogi (9)). An explanation of this will be given later.

The physical meaning of the constant b has been discussed very much, but is not yet very clear. Some investigators relate it with the tectonic structure of the seismic regions. Mogi (7) studied experimentally the elastic shocks caused by the fracture of brittle material under constant and under increasing with time stress. He found that the Ishimoto-Iida's relation holds when the structure of the material is irregular or when the applied stress is not uniform. The values of b which Mogi found for the elastic shocks in granite speciments lie between 0.5 and 1.0, and are almost the same as in earthquakes. The value of b increases as the degree of heterogeneity increases and as the degree of symmetry of the applied stress decreases. Values of b up to 2.0 have been found experimentally as well as from seismic data. Even values up to 3.0 have been found for some volcanic earthquakes.

When the structure is regular and the stress is applied uniformly the relation $\log n = f(M)$ is a concavely downwards curve which is represented by two or more straight lines.

Theories on the Mechanism of Generation of Aftershocks.

Two main ideas are known to us on the mechanism of generation of aftershocks. The one is due to Benioff and the other to Mogi. Both ideas are based on experimental and observational results as well as on theoretical considerations. Attempts also have been made to explain the process of generation of aftershocks by the rheological equations of Maxwell and Kelvin.

Benioff (2) presented experimental as well as theoretical evidence that aftershocks are produced by creep of the fault rocks. He found that at the beginning for some time interval after the main shock the creep is compressional and the following equation derived by Griggs from laboratory experiments fits this data:

$$\Sigma \varepsilon_i = \xi = a + b \log t \,, \qquad [11]$$

where ε is the strain and ξ is the cumulative creep strain in $(\text{ergs})^{1/2}$, t is the time measured from the main shock in days and a and b are constants. After some time interval from the main shock a second phase follows. The following equation represents satisfactorily this phase:

$$\Sigma \varepsilon_i = \xi = A + B \left[1 - \exp\left(-\gamma \sqrt{t - T}\right)\right] \,, \qquad [12]$$

where T is the time when the second phase starts, A is the strain released in the time between the main shock and the start of this phase,

B is the strain released in the second phase and, γ is a constant related to the relaxation time τ (the time in which the strain drops to $1/e$ of the initial value) by the:

$$\gamma = \frac{1}{\sqrt{\tau}} \,. \qquad [13]$$

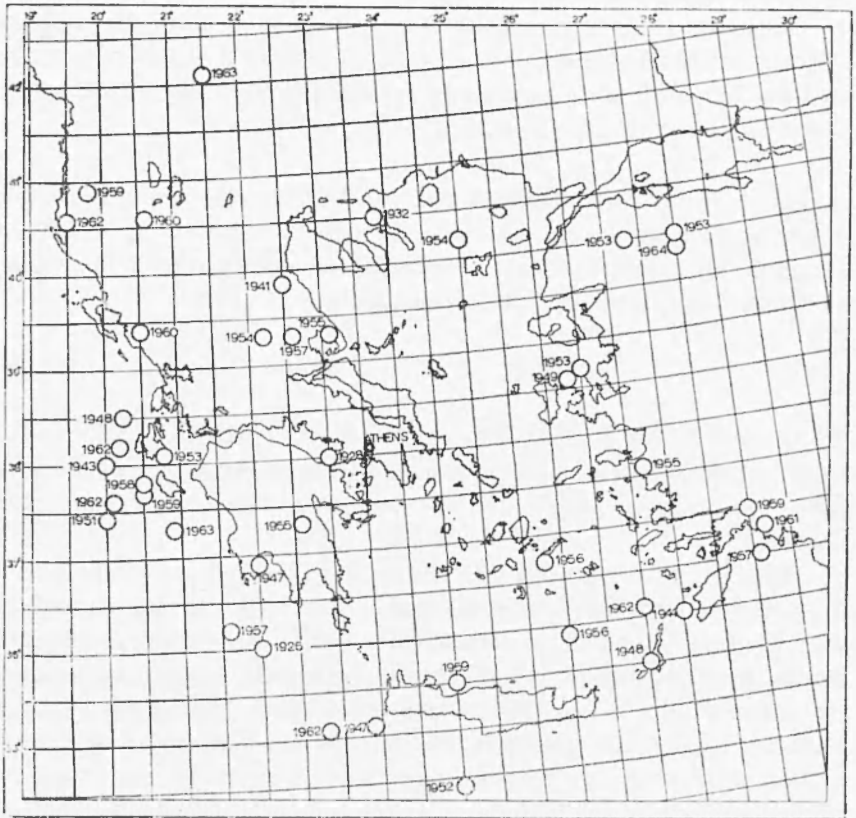

Fig. 1 – Index map of the epicenters of the shallow earthquakes of $M \geq 6$ occurred in the region of Greece from 1926 till 1964.

Originally this second phase of the strain release was characterized as shearing on the basis of experiments by Michelson but later Lomnitz gave the same type of strain-release characteristic for shear as for compression (Richter, ([13])). To calculate ε, the following formula was used:

$$\sqrt{J} = \sqrt{\frac{\mu}{2} p\, V \varepsilon^2} = K\varepsilon \qquad [14]$$

where p, is the fraction of the stored energy in the volume V of the rock which is converted into seismic wave energy J and μ is an elastic constant. The quantity K was considered constant and equal for all the aftershocks independently of their magnitude. That means that the focal volume of each aftershock was considered equal to the whole volume in which aftershock foci exist.

Båth and Duda (1) assumed that the constant K in the formula [14] depends on the magnitude of each aftershock because they found that the volume V of an earthquake is related to its magnitude M by [7]. Then, they used [14], [7] and

$$\log J = 12.24 + 1.44\ M \quad (J \text{ in ergs}) , \qquad [15]$$

to derive the following relation between the deformation $D - \varepsilon V$ (in cm³) and the magnitude of the earthquakes:

$$\log D = 5.17 + 1.46\ M\ . \qquad [16]$$

By the use of this formula they calculated the cumulative deformation in the aftershock zone and plotted it as a function of time. In their plots the compressional and the supposed shear phase are also observed.

Mogi (6), (7), (8), (9), (10) in a series of papers presented his results derived from studying experimentally the elastic shocks caused by the fracture of solid materials. He also used his experimental results to study the fore and aftershock sequences and the swarms. According to him the foreshocks (and other small earthquakes) occur at structurally irregular points in the Earth's crust where stress concentration takes place and local fractures occur at a stress lower than the normal strength of the material. At the time of a principal earthquake not all of the accumulated strain energy is released. The remaining part of the energy concentrates around the focus at many weak points in the region which has been fractured by the main shock. The number of aftershocks is larger than the number of foreshocks because the main shock causes new cracks and thus the number of irregular points increases. Mogi showed that no foreshocks occur when the structure is homogeneous and the stress is applied uniformly. Swarms are observed in the case of very irregular structure and / or concentrated stress. In the intermediate case (moderately irregular structure and / or not uniform stress) both foreshocks and aftershocks occur.

The process of relaxation of stress in the aftershock zones may be studied by the rheological theory and mainly by applying the Maxwell's equation:

$$\frac{d\varepsilon_{ij}}{dt} = \frac{1}{2\,\mu}\,\frac{d\sigma_{ij}}{dt} + \frac{\sigma_{ij}}{\eta}\,, \qquad i \neq j \qquad [17]$$

as well as by the Kelvin's equation:

$$\sigma_{ij} = 2\,\mu\varepsilon_{ij} + 2\,\eta\,\frac{d\varepsilon_{ij}}{dt}\,, \qquad i \neq j \qquad [18]$$

where ε is the strain, σ the stress, μ the coefficient of rigidity and η the coefficient of viscosity. The relaxation time under some conditions is given by

$$\tau = \frac{\eta}{\mu}\,. \qquad [19]$$

Pshennikov (12) assumed that in the case of aftershocks ε can be considered almost constant, that is $\frac{d\varepsilon}{dt} = 0$. Then from [17] we can receive:

$$\sigma = \sigma_o\, e^{-\frac{t}{\tau}}\,, \qquad [20]$$

where σ_o is the total stress released by all the aftershocks of the sequence. To calculate σ_o he used the relation:

$$\sigma_o = \sum_{i=1}^{n} \sqrt{E_i}\,, \qquad [21]$$

where n is the total number of aftershocks and E_i is the energy of each aftershock given by

$$\log E_i = 11.8 + 1.5\,M_i\,, \qquad [22]$$

σ is the stress remained in the strained region at time t measured from the occurrence of the main shock and is given by the:

$$\sigma = \sigma_o - \sigma_k = \sigma_o - \sum_{i=1}^{k} \sqrt{E_i}\,, \qquad [23]$$

where k is the number of all aftershocks which occur during the interval from 0 to t. From [20] we can get:

$$\tau = \frac{t \log e}{\log \dfrac{\sigma_0}{\sigma}} . \qquad [24]$$

Taking a fix time unit e.g. 1 day, τ is determined as a function of t. Pshennikov found a linear relation between the relaxation time τ and t. That is:

$$\tau = a + bt . \qquad [25]$$

Then, he found that the relation:

$$\sigma = \sigma_0 \exp\left(-\frac{t}{a + bt}\right) \qquad [26]$$

fits the observational data well.

The data.

The aftershock sequences of 40 earthquakes of normal focal depth ($h \leq 70$ km) and magnitude $6.0 \leq M \leq 7.5$ occurred in the region of Greece from 1926 till 1964 are investigated. Code numbers, dates, origin times, focal depths, magnitudes and locations of these earthquakes are listed in Table I. These data, except the focal depths, have been taken from " A Catalogue of Shocks with $I_0 \geq$ VI or $M \geq 5$ " by A. G. Galanopoulos and from the Bulletins of the Seismological Institute of the National Observatory of Athens. An index map which shows the epicenters of these earthquakes is given in Figure 1. The epicenters of three earthquakes, one close to the southern coast of Turkey and the other two in northern Turkey, are not shown in this map.

Determination of Focal Depths.

Many quantities calculated in this study vary with the depth of the focus of the main shock. Consequently, it was necessary to calculate depths as accurately as possible. In dealing with focal depths the first problem from us faced, was the distinction between normal and intermediate earthquakes since no deep focus earthquakes are known to occur in this region. Galanopoulos separates the normal from the intermediate earthquakes in his tables by giving focal depths for the intermediate earthquakes on the basis of macroseismic data and data taken from ISS, BCIS and USCGS. Some additional criteria have been applied in this study for this distinction: characteristics of the seismograms and the existence of aftershocks.

The records of all the earthquakes of $M \geq 6$ occurred from 1926 till 1964 in the region considered, have been examined very carefully for *PcP* and *ScS* phases and the focal depths were calculated by using the Jeffreys- Bullen tables. In all the cases when large focal depths were found the amplitudes of the beginning of the *P* waves were large in the vertical component and the general appearance of the seismograms was very different from that of the shallow shocks. In the case of intermediate earthquakes very few small or no aftershocks have been recorded by the Wiechert seismographs. Thus, the depths calculated by using *PcP* or *ScS* phases, the appearance of the seismograms and the existence of aftershocks have been used as additional criteria to separate the normal from the intermediate earthquakes. The result is that from all the earthquakes examined only those which are listed in Table I have their foci above a depth of about 70 km. The problem then was to determine the focal depths of these normal earthquakes with some accuracy.

Focal depths for some of these earthquakes are given by ISS, BCIS and USCGS, but in calculating these depths they do not take into account the complex structure of this region. Little was known up to few months ago about this structure. Some basic properties of the crustal structure of the region of Greece have been derived recently by members of our Institute by using the refraction and reflection methods as well as surface wave techniques. On the basis of these results, most of the focal depths of the earthquakes which have their foci in the crust ($H \leq 40$ km) have been calculated by using various methods and mainly the time difference between arrivals of several phases. The mean crustal thickness from six provinces in the region of Greece to several stations has been calculated from data given by Papazachos, Comninakis and Drakopoulos ([11]). Thus, the focal depth of each earthquake has been calculated by using data of many stations. In the cases when the deviation of one value from the mean was large this value was discarded. The focal depths for some earthquakes bellow the crust have been taken from, ISS, BCIS and USCGS. These focal depths have been used to derive formulas [40] and [41] which relate the number of aftershocks of $M \geq 4$ with the focal depth and magnitude of the main shock. These two formulas have been used to calculate focal depths when no other methods could be applied for this purpose. The depths calculated by using formula [40] or [41] are noted by an asterisk in Table I.

Determination of the Magnitudes of the Shocks of each Sequence.

The trace amplitudes of all the foreshocks and aftershocks of each sequence have been measured on the same component of one seismograph at the station in Athens. The measurements have been made on the records of the horizontal Mainka seismograph from 1926 till 1928 and on the verical Wiechert seismograph from 1928 till 1964. To calculate the magnitude M' of each shock of the sequence for which an amplitude A' was measured the following relation was used:

$$M' = \log A' + M - \frac{\sum_{i=1}^{n} \log A_i}{n} \qquad [27]$$

where M is the mean value of the magnitude of all the large shocks of the sequence and A_i and n are the amplitude and number of these large shocks. The magnitudes of the largest shocks are known from other sources.

The dates, arrival times in Athens and magnitudes of all the shocks of each sequence are in Table III. In Table II the magnitudes of the largest aftershocks are given for thirty nine earthquakes of magnitude between 5.2 and 6.0. The data of this Table have been taken from Galanopoulos' Tables and from the Bulletins of the Institute.

Procedure for investigation.

After the determination of the magnitude of each aftershock, the formula [16] was used to calculate the deformation corresponding to each aftershock. The cumulative deformation was plotted versus time on semilogarithmic paper. The parameters of the relations [11] and [12] were determined, when possible, by using D_i instead of ε_i. In the same semilogarithmic paper the two curves were drawn to show the goodness of fit. To calculate the relaxation time for the " shear phase " the following method was applied.

Taking as zero point of the time axis the time when the " shear phase " starts the deformation D_i which occurred each day has been computed. The deformation D_k which occurred after the t_k day ($k = 1, 2, \ldots$) has been calculated by using the formula:

$$D_k = D_o - \sum_{i=1}^{k} D_i\,, \qquad [28]$$

where D_o is the total deformation occurred in the aftershock region. Assuming that

$$D_k = D_o \exp\left(-\sqrt{\frac{t_k}{\tau_k}}\right) \qquad [29]$$

the relaxation time τ_k for each day was calculated by the formula:

$$\tau_k = \frac{t_k \log^2 e}{\log^2 \dfrac{D_o}{D_k}}\,, \qquad [30]$$

τ_k was plotted against t_k and it was found almost independent of it in all cases. Then the formula:

$$\tau = \frac{\sum\limits_{k=1}^{n} \tau_k}{n} \qquad [31]$$

was applied to find the mean relaxation time for each sequence.

The relations [20] and [26] have been also applied. The formula [26] fits the data fairly well in many cases but the data were fitted better by the [29]. That is why the relaxation time calculated by [30] and [31] was finally adopted for the " shear phase ".

The equation of the cumulative frequency of the magnitude has been determined. This equations is of the form:

$$\log N = A - b' M \qquad [32]$$

where N is the number of aftershocks which have magnitudes equal to and larger than M, and A and b' are constants chosen to fit the data.

The constant b', is not the same as the constant b in the relation [9] but it also expresses how the number of small aftershocks increases with decreasing magnitude and consequently it is a measure of the heterogeneity of the material in the aftershock region or of the uniformity of the stress.

The cumulative time distribution:

$$N(t) = \int_t^{t_o} n(t)\, dt \qquad [33]$$

is then studied. It was found that the relation

$$\log N = B - H \log t \qquad [34]$$

holds in most of the cases up to certain time t_1. Assuming that the relation [2] is valid, we have

$$N(t) = \int_t^{t_o} n(t)\, dt = \int^{t_o} n_1 t^{-h}\, dt = \frac{n_1}{h-1} \left(t^{1-h} - t_o^{1-h}\right) . \qquad [35]$$

Mogi ([6]) gives values for the constant h between about 1.0 and 2.0. Therefore $(h-1) > 0$. This means that for $t_o \gg t$, we receive

$$N(t) = Bt^{-H} \qquad [36]$$

where

$$H = h - 1 , \qquad B = \frac{n_1}{h-1} . \qquad [37]$$

The formula [36] was applied for all the aftershocks which have magnitude equal to and larger than 4 and it fitted the data well up to a certain time $t_1 \ll t_o$ in almost all the cases when enough data were available.

The number of aftershocks with $M \geq 4$ and the magnitude of the largest aftershock were related with the magnitude and focal depth of the main shock. The spacial distribution of the constant b' in the relation [32] was also examined.

In the following, a description is made for each sequence. Plots of the data have not been made in all cases. No large aftershocks followed the earthquakes with code numbers, 12b, 36b, 42 and 43. There is evidence that these earthquakes are very shallow.

1. – *Aftershocks of the Southern Sporades Earthquake of March 18, 1926.*

The epicenter of this earthquake is in the Eastern Mediterranean Sea, about 170 km SE of Rhodes and 120 km off the South coast of Turkey. Its magnitude is 6.9. It caused considerable damage and casualties in the Asia Minore. Eighteen aftershocks of magnitude $3.9 \leq M \leq 5.7$ have been recorded at the Seismological Station in Athens by a Mainka seismograph. The dates, arrival times and the magnitudes of these aftershocks are listed in Table III (1).

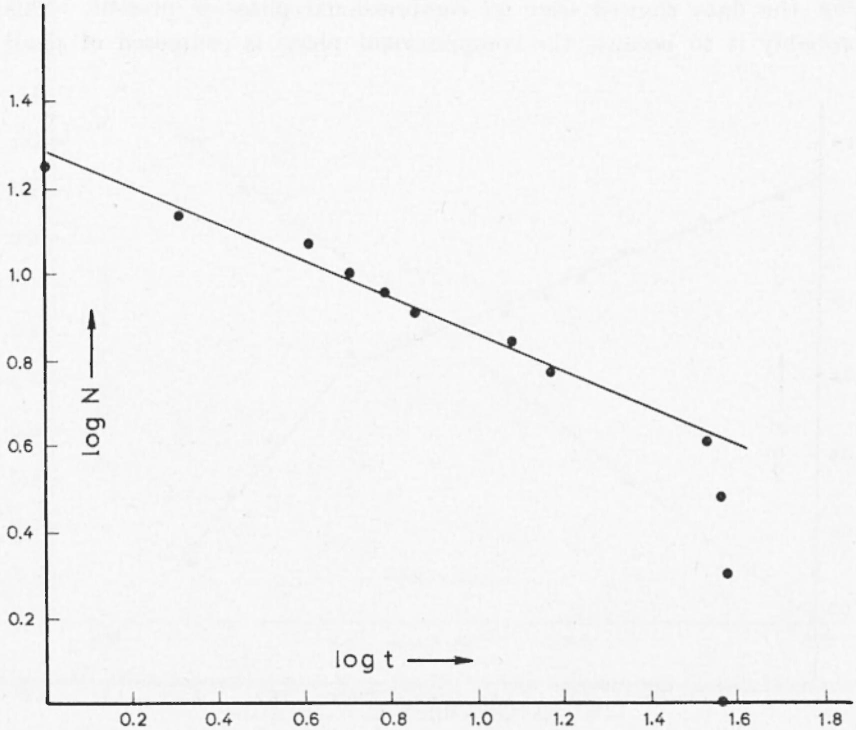

Fig. 2 – Time distribution of the aftershocks of the Southern Sporades Earthquake of March 18, 1926.

The logarithm of the number N, of aftershocks which occurred after $t-1$ days after the main shock is plotted against the logarithm of t in Figure 2. The following relation fits the data, in the least square sense:

$$\log N = 1.28 - 0.43 \log t . \qquad t \leqq 33 \text{ days} \qquad [38]$$

The logarithm of the cumulative frequency function of the magnitude is plotted against M in Figure 3. We see that this plot is a concavely downward curve composed of two straight lines with equations:

$$\log N = 2.85 - 0.40\, M \qquad 3.8 \leq M \leqq 5$$

$$\log N = 6.96 - 1.22\, M \qquad 5 \leqq M \leqq 5.7 .$$

The deformation characteristic of the supposed shear phase is roughly expressed by the

$$\Sigma D = \{1.12 + 5.78 [1 - \exp(-0.69 \sqrt{t - 0.16})]\} \times 10^{13} \text{ cm}^3 .$$

Plot the data showed that uo compressional phase is present. This probably is so because the compressional phase is composed of small

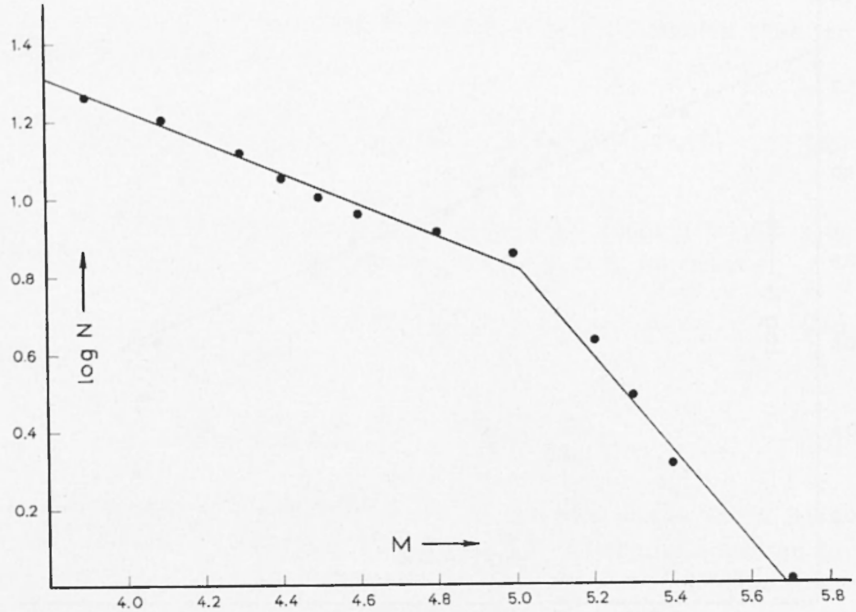

Fig. 3 - Distribution of the Magnitudes of the aftershocks of the Southern Sporades Earthquake of March 18, 1926.

earthquakes which have not been recorded by the Mainka seismograph at that time since the epicentral distance is more than 600 km. The relaxation time is 2.0 days.

2. - *Aftershocks of the Messinia Earthquake of September 19, 1926.*

The epicenter of this shock is off the south coast of Peloponnesus. Its magnitude is 6.2. Eleven aftershocks of magnitude $3.5 \leq M \leq 5$ have been recorded in Athens. The dates, arrival times and magnitudes are listed in Table III - (2). The logarithm of the number of aftershocks of magnitude M and larger is plotted against, M in Figure 4. This relation is expressed by the:

$$\log N = 3.82 - 0.77\, M \,. \qquad [39]$$

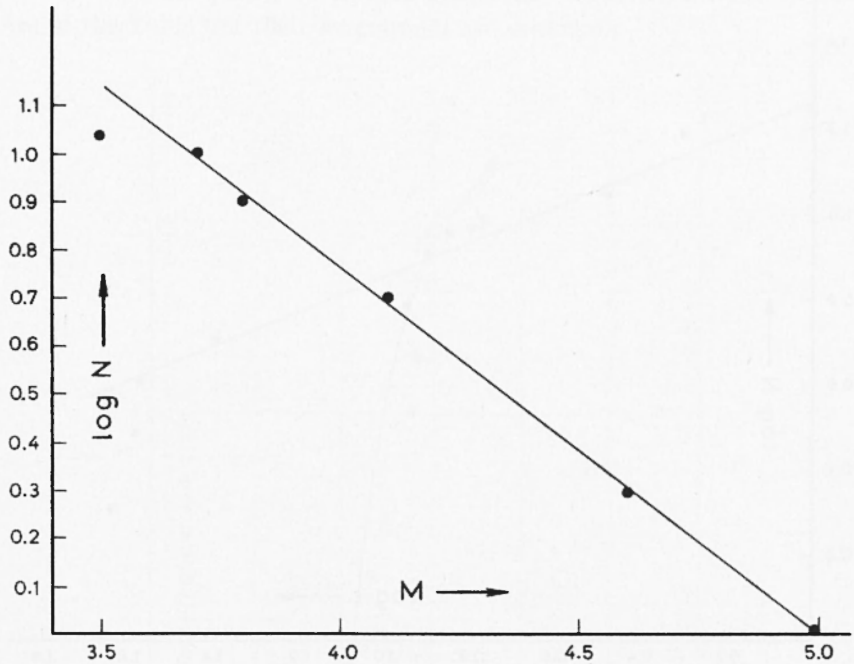

Fig. 4 – Distribution of the Magnitudes of the aftershocks of the Messinia Earthquake of September 19, 1926.

3. – *Aftershocks of the Corinth Earthquake of April 22, 1928.*

This earthquake caused extensive property damage and casualties in Corinth. Its magnitude is 6.2. Eighteen aftershocks of magnitude $4.2 \leq M \leq 5.2$ have been recorded by the Wiechert seismographs in Athens. Some smaller earthquakes which are probably aftershocks have been recorded but they were omitted because the uncertainty in measuring the amplitudes is big. Only one foreshock with magnitude larger than 4.1 has been recorded. Its magnitude is 5.3. The dates, arrival times and magnitudes of these aftershocks are listed in Table III -(3). The time distribution of the aftershocks of $M \geq 4$ is roughly expressed by the:

$$\log N = 1.26 - 0.41 \log t \,, \qquad t \leq 36 \text{ days}$$

where N is the number of aftershocks which occurred in the t day after the main shock and after that day. This distribution is shown in Figure 5.

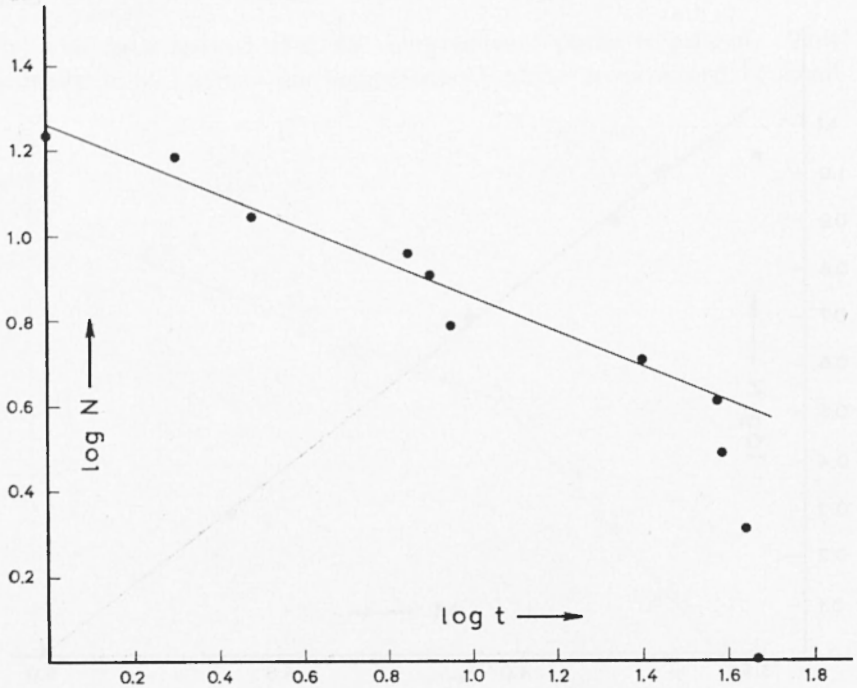

Fig. 5 – Time distribution of the aftershocks of the Corinth Earthquake of April 22, 1928.

The deformation characteristics are shown in Figure 6.

The equation for the " shear phase " is:

$$\Sigma D = \{0.60 + 3.60 \left[1 - \exp\left(-0.55 \sqrt{t - 1.0}\right)\right]\} \times 10^{13} \text{ cm}^3 .$$

The relaxation time for the " shear phase " is 3.4 days.

4. – *Aftershocks of the Chalkidike Earthquake of September 26, 1932.*

The epicenter of the main shock is probably in the Gulf of Hierissos. Its magnitude is 6.9. Extensive damage has been caused by the main shock as well as by many large aftershocks in the region of Chalkidike. Two of these aftershocks have magnitudes 6.2 and 6.3. This aftershock sequence probably lasted till the beginning of 1934 but the aftershocks after July 19, 1933 were very few and of small magnitude. The dates, arrival times and magnitudes of the aftershocks are listed in Table III-(4). The total number of aftershocks of magnitude $3.9 \leq M \leq 6.3$ is 63. Thirty six earthquakes of smaller magnitude have been recorded and are in the Table but their magnitudes are uncertain.

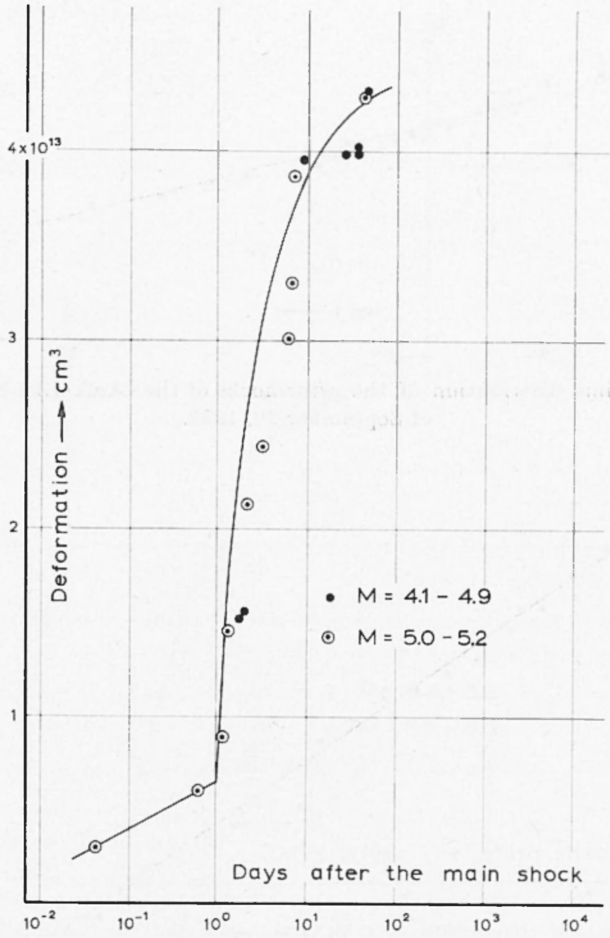

Fig. 6 – Deformation characteristics of the aftershock sequence of the Corinth Earthquake of April 22, 1928.

One can see in the Table III-(4) and in Figure 9 that the sequence is divided in two groups. The first lasted till December 29, 1932. After that no aftershocks of magnitude larger than about 3.8 has been recorded till May 8, 1933, when an aftershock of magnitude 5 occurred. The second group started after a large " late aftershock " of magnitude 6.3 which occurred on May 11, 1933. This shock is responsible for

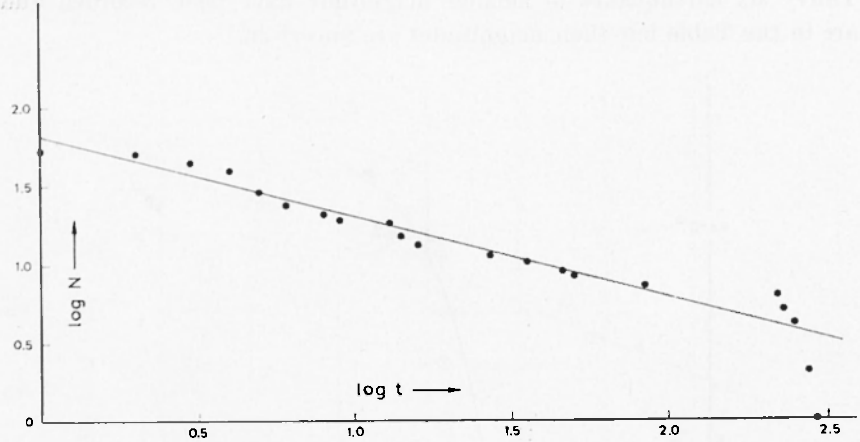

Fig. 7 – Time distribution of the aftershocks of the Chalkidike Earthquake of September 26, 1932.

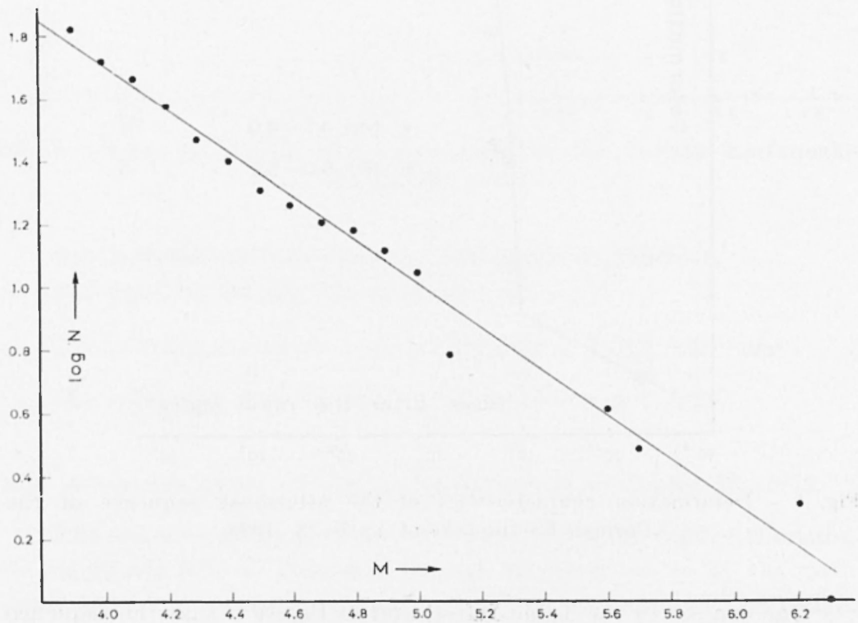

Fig. 8 – Distribution of the Magnitudes of the aftershocks of the Chalkidike Earthquake of September 26, 1932.

the second group of aftershocks. The fact that this earthquake has its own aftershocks probably means that the foci of this large " late aftershock " and its aftershocks are not in the aftershock volume of the main shock. However, we have no other evidence, in this case, that this is so.

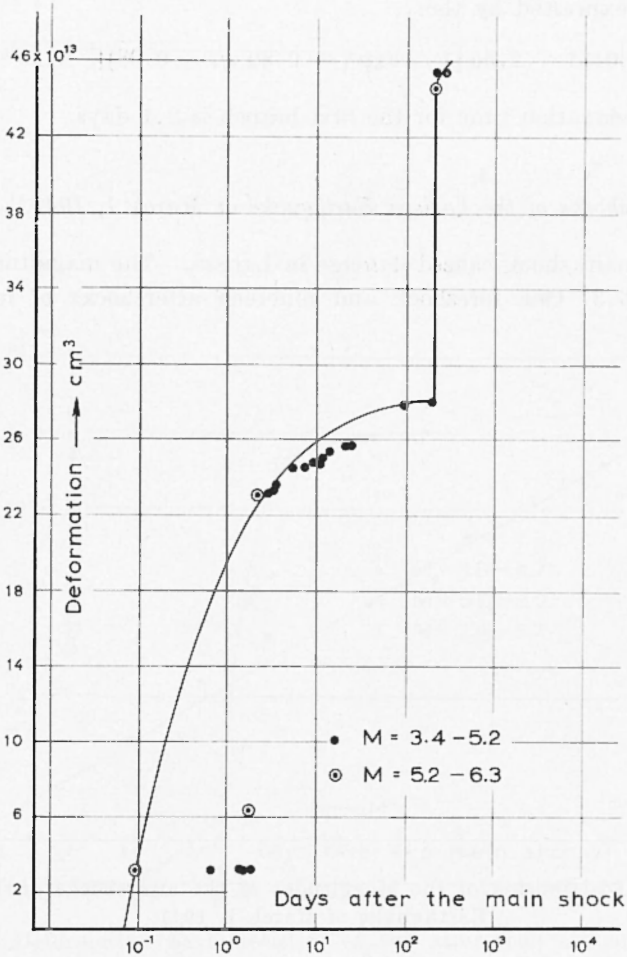

Fig. 9 – Deformation characteristics of the aftershock sequence of the Chalkidike Earthquake of September 26, 1932.

The logarithm of the number of aftershocks of magnitude $M \geq 4$ occurred in the t day after the main shock and after that day is plotted in Figure 7 against the log t. This relation is expressed by the:

$$\log N = 1.80 - 0.52 \log t \qquad t \leq 250 \text{ days} .$$

The cumulative magnitude distribution is expressed by the:

$$\log N = 4.50 - 0.70\, M$$

and is shown in Figure 8.

The deformation characteristics are shown in Figure 9. The first branch is expressed by the:

$$\Sigma D = \{0.31 + 2.50\,[1 - \exp\,(-0.89\,\sqrt{t - 0.08})]\} \times 10^{14}\ \mathrm{cm}^3\,.$$

The relaxation time for the first branch is 2.1 days.

5. - *Aftershocks of the Larissa Earthquake of March 1, 1941.*

The main shock caused damage in Larissa. The magnitude of this shock is 6.3. One foreshock and nineteen aftershocks of magnitude

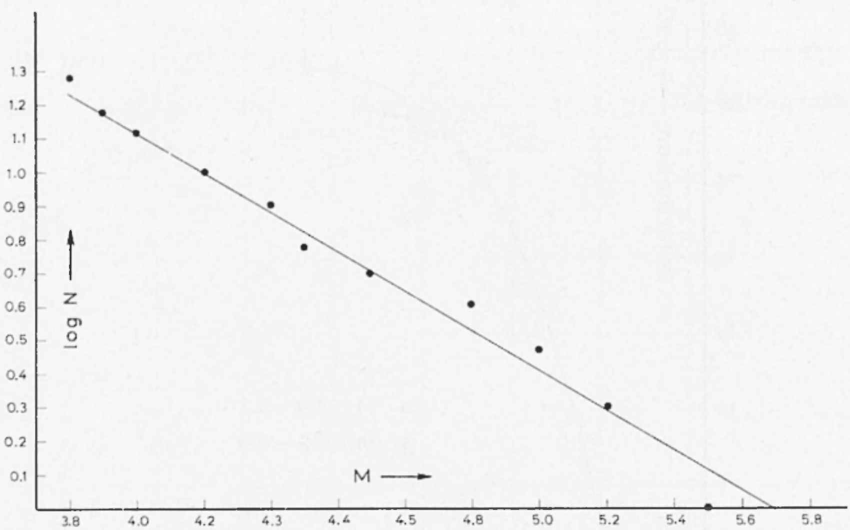

Fig. 10 - Distribution of the Magnitudes of the aftershocks of the Larissa Earthquake of March 1, 1941.

$3.8 \leq M \leq 5.2$ were recorded till March 18, and no other aftershocks of $M \geq 3.8$ have been recorded till May 14, when one " late aftershock " of magnitude $M = 5^1/_2\text{-}5^3/_4$ occurred. Another shock of magnitude $5^1/_4\text{-}5^1/_2$ was recorded on May 16. The epicenter of these two " late aftershocks " is about 25 km southeast of the epicenter of the main shock. The dates, arrival times and magnitudes of the earthquakes of this sequence are listed in Table III-(5). The cumulative magnitude distribution is shown in Figure 10 and is expressed by the:

$$\log N = 3.56 - 0.61\, M\,.$$

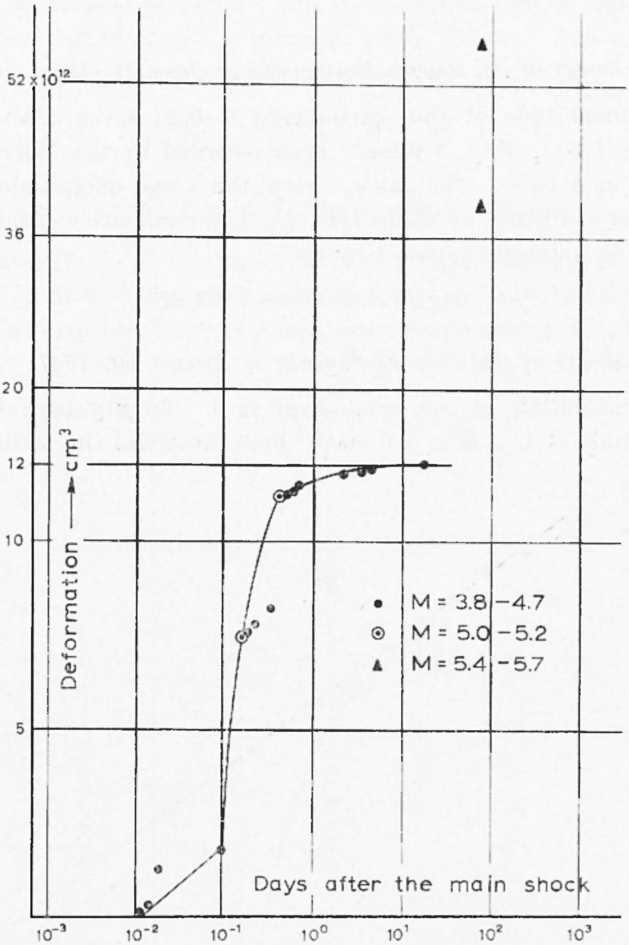

Fig. 11 – Deformation characteristics of the aftershock sequence of the Larissa Earthquake of March 1, 1941.

The deformation characteristics are shown in Figure 11. Three branches are observed. The equation for the second branch is:

$$\Sigma D = \left[12.0 - 10.2 \exp\left(-3.27 \sqrt{t - 0.10}\right)\right] \times 10^{12}\ \mathrm{cm}^3\,.$$

The relaxation time for the second phase is 0.2 days.

6. – *Aftershocks of the Kephallenia Earthquake of February 14, 1943.*

The magnitude of the main shock is 6. Two aftershocks of magnitude 5.2 and 4.3 occurred at 09^h26^m and 14^h02^m on February 14, respectively.

7. – *Aftershocks of the Rhodes Earthquake of May 27, 1944.*

The magnitude of this earthquake is 6.2. Seven aftershocks of magnitude $4.3 \leq M \leq 5.0$ have been recorded by the Wiechert seismographs in Athens. The dates, arrival times and magnitudes of these aftershocks are listed iu Table III-(7). The cumulative magnitude distribution is roughly expressed by the:

$$\log N = 5.20 - 1.03\, M\ .$$

8. – *Aftershocks of the Crete Earthquake of August 30, 1947.*

The magnitude of this earthquake is 6. Twenty two aftershocks of magnitude $3.1 \leq M \leq 5.0$ have been recorded in Athens. The

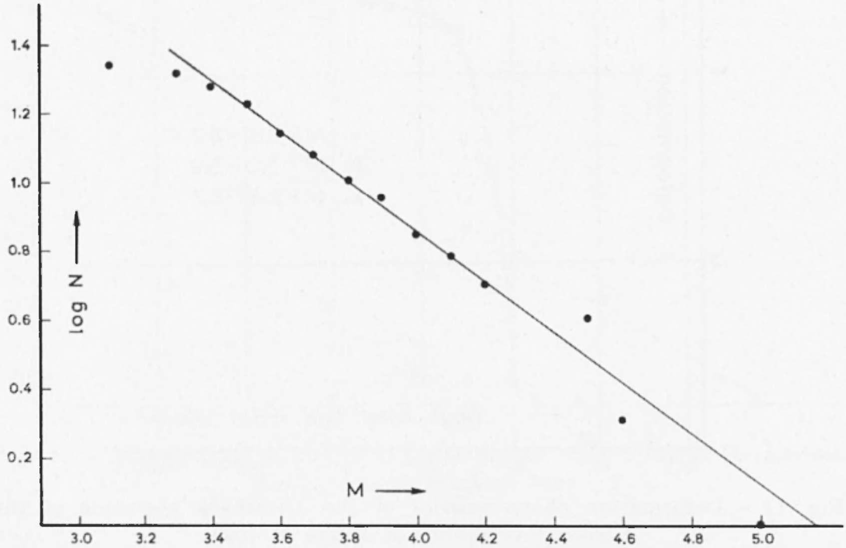

Fig. 12 – Distribution of the Magnitudes of the aftershocks of the Crete Earthquake of August 30, 1947.

dates, arrival times and magnitudes are listed in Table III-(8). The magnitude distribution is shown in Figure 12 and is expressed by the:

$$\log N = 3.77 - 0.73\, M\ .$$

9. – *Aftershocks of the Messinia Earthquake of October 6, 1947.*

The magnitude of the main shock is 7. This earthquake caused damage and casualties in Messinia. Only ten aftershocks of magnitude $M \geqq 3.5$ have been recorded. The dates, arrival times and magnitudes of these earthquakes are given in Table III-(9). The cumulative magnitude distribution is roughly expressed by the:

$$\log N = 2.81 - 0.54\, M\,.$$

10. – *Aftershocks of the Karpathos Earthquake of February 9, 1948.*

The magnitude of this shock is 7.1. Thirty aftershocks of magnitude $4.4. \leq M \leq 5.8$ have been recorded in Athens. Three of them are " late aftershocks " one of which has a magnitude 5.8. The dates,

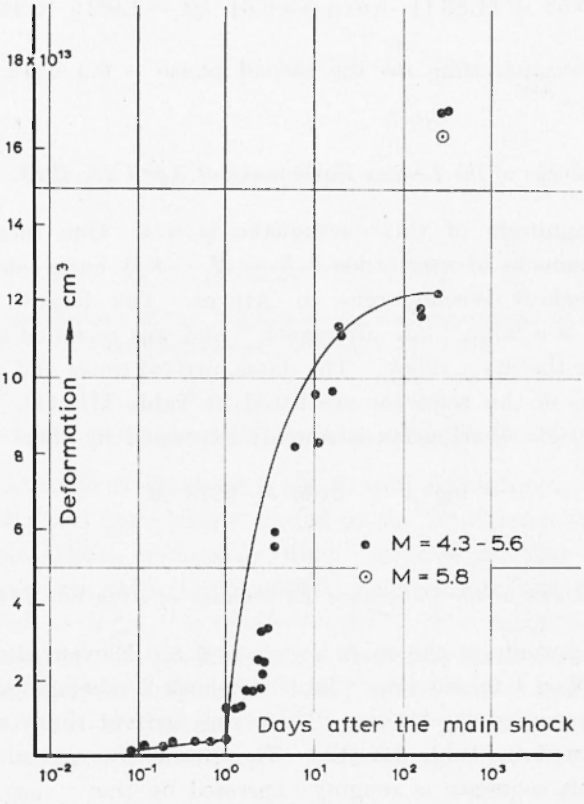

Fig. 13 – Deformation characteristics of the aftershock sequence of the Karpathos Earthquake of February 9, 1948.

arrival times and magnitudes of these shocks are given in Table III-(10). The time distribution is roughly expressed by the:

$$\log N = 1.50 - 0.71 \log t .$$

The cumulative magnitude distribution is expressed by the:

$$\log N = 4.40 - 0.68 \ M .$$

The deformation characteristics are shown in Figure 13. The equation for the compressional phase is:

$$\Sigma D = (0.52 + 0.41 \log t) \times 10^{13} \text{ cm}^3 .$$

The equation for the second phase is:

$$\Sigma D = \{0.53 + 11.83 \left[1 - \exp\left(- 0.51 \ \sqrt{t - 1.06}\right)\right]\} \times 10^{13} \text{ cm}^3 .$$

The relaxation time for the second phase is 6.5 days.

11. – *Aftershocks of the Leukas Earthquake of April 22, 1948.*

The magnitude of this earthquake is 6.4. One foreshock and twenty aftershocks of magnitude $3.8 \leq M \leq 6.3$ have been recorded by the Wiechert seismographs in Athens. The largest aftershock ($M_1 = 6.3$) is a large " late aftershock " and was recorded about three months after the main shock. The dates, arrival times and magnitudes of the shocks of this sequence are listed in Table III-(11). The cumulative magnitude distribution is roughly expressed by the:

$$\log N = 3.96 - 0.73 \ M .$$

12. – *Aftershocks of the Oenoussae Earthquake of July 23, 1949.*

The magnitude of the main shock is 6.8. Eleven aftershocks of magnitude $M \geq 4.0$ and one " late aftershock " of magnitude $M = 6$, have been recorded in Athens. The dates, arrival times and magnitudes are listed in Table III-(12). The cumulative magnitude distribution of this sequence is roughly expressed by the:

$$\log N = 4.24 - 0.81 \ M .$$

13. – *Aftershocks of the SW Crete Earthquake of December 17, 1952.*

The magnitude of the main shock is $6^3/_4$. Ten aftershocks of magnitude $4.1 \leq M \leq 6.0$ have been recorded by the Wiechert seismographs in Athens. The dates, arrival times and magnitudes of these earthquakes are listed in Table III-(13). The cumulative magnitude distribution is shown in Figure 14 and is expressed by the:

$$\log N = 2.34 - 0.33\ M\ .$$

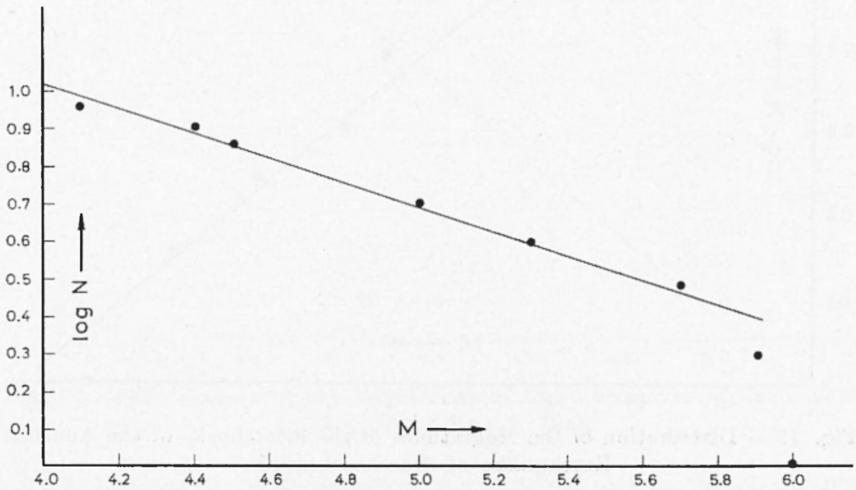

Fig. 14 – Distribution of the Magnitudes of the aftershocks of the SW Crete Earthquake of December 17, 1952.

14. – *Aftershocks of the Anatolia Earthquake of March 18, 1953.*

The magnitude of this shock is 7.2. Twenty one aftershocks of magnitude $4.1 \leq M \leq 5.7$ have been recorded by the Wiechert seismographs in Athens. The Lesbos earthquake which occurred on May 2, 1953 and the Anatolia earthquake (40°N, 28°E) occurred on June 3, 1953, can be considered as large " late aftershocks ". The magnitude of both these earthquakes is 6.0. They are followed by their own aftershocks and are studied separately. The dates, arrival times and magnitudes of the aftershocks of this sequence are listed in Table III-(14). The cumulative magnitude distribution is shown in Figure 15 and is expressed by the:

$$\log N = 4.64 - 0.78\ M\ .$$

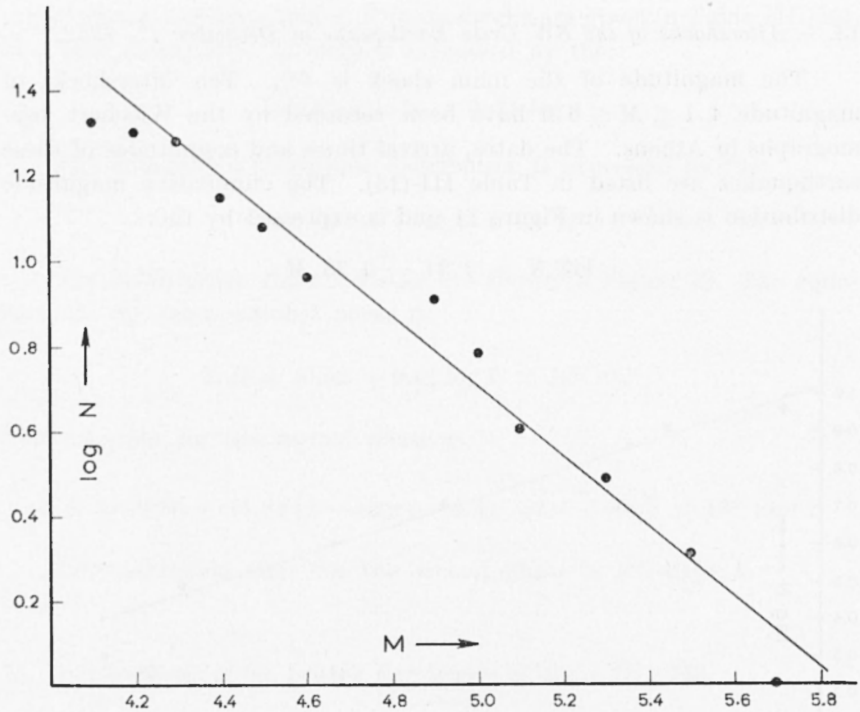

Fig. 15 – Distribution of the Magnitudes of the aftershocks of the Anatolia Earthquake of March 18. 1953.

15. – *Aftershocks of the Lesbos Earthquake of May 2, 1953.*

The magnitude of the main shock is probably a little less then 6. Its epicenter is about 20 km south of Mytilene. Three foreshocks and nine aftershocks of magnitude $4.1 \leqq M \leq 5.1$ have been recorded in Athens. The dates, arrival times and magnitudes are listed in Table III-(15). The time distribution of the aftershocks with $M \geqq 4.1$ is roughly expressed by the:

$$\log N = 0.96 - 0.37 \log t \qquad t \leqq 10 \text{ days} .$$

The magnitude distribution is shown in Figure 16 and is represented by the:

$$\log N = 4.25 - 0.84\, M .$$

The deformation has been plotted against time but it is not shown here. The compressional phase lasted about 12 days. After that an

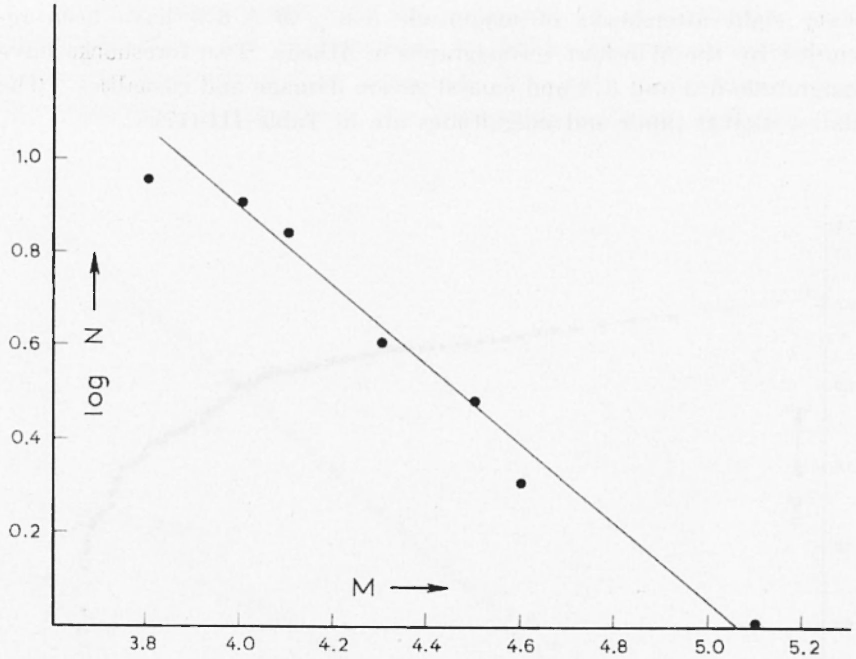

Fig. 16 – Distribution of the Magnitudes of the aftershocks of the Lesbos Earthquake of May 2, 1953.

abrupt increase of the deformation was observed due to the occurrence of the largest and last aftershock of magnitude 5.1. The deformation characteristic of the compressional phase is expressed by the:

$$\Sigma D = (9.28 + 9.66 \log t) \times 10^{12} \text{ cm}^3 .$$

16. – *Aftershocks of the Anatolia Earthquake of June 3, 1953.*

The magnitude of the main shock is 6.0. Three aftershocks of magnitude $4.2 \leq M \leq 5.2$ have been recorded by the Wiechert Seismographs in Athens. The dates, arrival times and magnitudes of these earthquakes are listed in Table III-(16).

17. – *Foreshocks and Aftershocks of the Kephallenia Earthquake of August 12, 1953.*

The magnitude of this earthquakes is $7^1/_4$. Extremely high fore- and aftershock activity was observed for more than seven months. Fifty foreshocks of magnitude $3.9 \leq M \leq 6.8$ and four hundred and sixty eight aftershocks of magnitude $3.6 \leq M \leq 6.5$ have been recorded by the Wiechert seismographs in Athens. Two foreshocks have magnitude 6.3 and 6.8 and caused severe damage and casualties. The dates, arrival times and magnitudes are in Table III-(17).

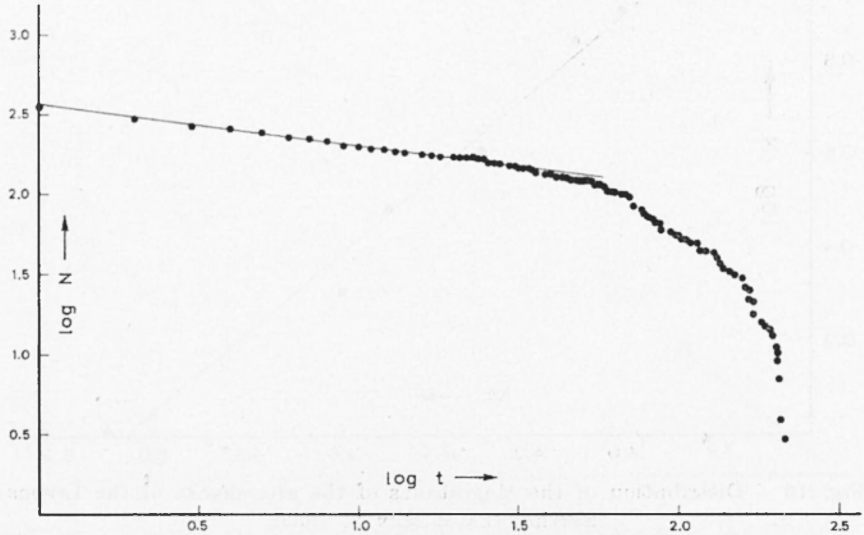

Fig. 17 – Time distribution of the aftershocks of the Kephallenia Earthquake of August 12, 1953.

The time and magnitude distribution of this aftershock sequence are shown in Figures 17 and 18 and are expressed by the:

$$\log N = 2.56 - 0.26 \log t \qquad t \leq 50 \text{ days}$$
$$\log N = 5.91 - 0.85\, M\,.$$

The cumulative distribution of the foreshocks is also shown in Figure 18 and is expressed by the:

$$\log N = 3.99 - 0.61\, M\,.$$

The deformation characteristics are shown in Figure 19. We can see three branches. The second phase starts at 0.8 days and lasts about one month. This phase is expresses by the:

$$\Sigma D = \{0.50 + 9.34\, [1 - \exp(-5.06 \sqrt{t - 0.09})]\} \times 10^{14}\ \text{cm}^3\,.$$

A third phase begins with the occurrence of an earthquake with magnitude $M = 5.9$ on September 14, 1953. This phase includes a larges "late aftershock" of magnitude $M = 6.5$. Immediately after the occurrence of this shock the earthquake activity increased. It

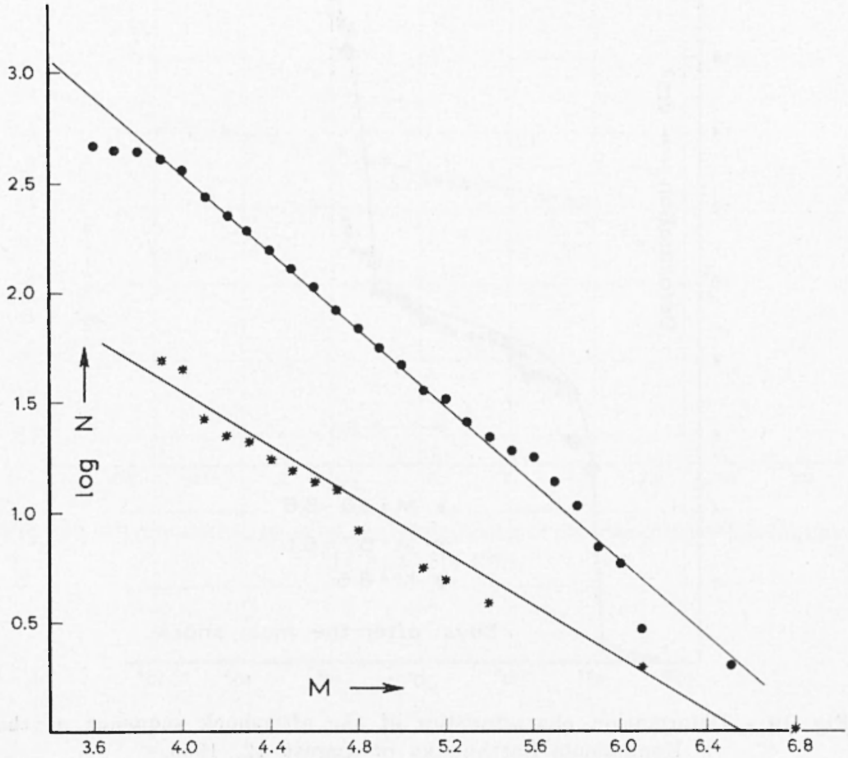

Fig. 18 – Distribution of the Magnitudes of the aftershocks and foreshocks of the Kephallenia Earthquake of August 12, 1953.

means that this shock has its own aftershocks. From this we can probably conclude that most of the shocks of the third branch come from a different seismic volume. This is supported by the fact that the macroseismic epicenter of the large "late aftershock" differs from the epicenter of the main shock. The third phase can be expressed by the:

$$\Sigma D = \{9.85 + 10.39\,[1 - \exp(-0.10\,\sqrt{t - 32.07})]\} \times 10^{14}\ \mathrm{cm}^3 .$$

The relaxation time for the second phase is 0.3 days.

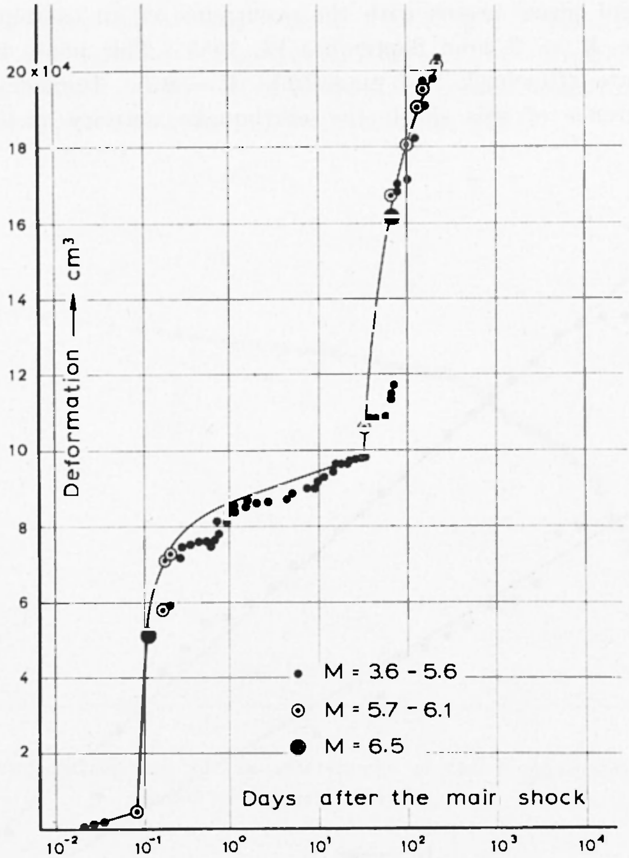

Fig. 19 – Deformation characteristics of the aftershock sequence of the Kephallenia Earthquake of August 12, 1953.

18. – *Aftershocks of the Shophades Earthquake of April 30, 1954.*

The epicenter of this earthquake is very close to the town of Sophades in the Western Thessaly. It caused severe damage and casualties. Its magnitude is 7. Ten foreshocks and two hundred ninety nine aftershocks of magnitude $3.2 \leq M \leq 5.9$ have been recorded by the Wiechert seismographs in Athens. Their dates, arrival times and magnitudes are in Table III-(18).

The time distribution for the aftershocks of $M \geq 4$ is shown in Figure 20 and is expressed by the:

$$\log N = 1.97 - 0.41 \text{ lot } t \qquad t \leq 27 \text{ days} .$$

The magnitude distribution of the aftershocks is shown in Figure 21 and is expressed by the:

$$\log N = 5.92 - 1.00\, M\ .$$

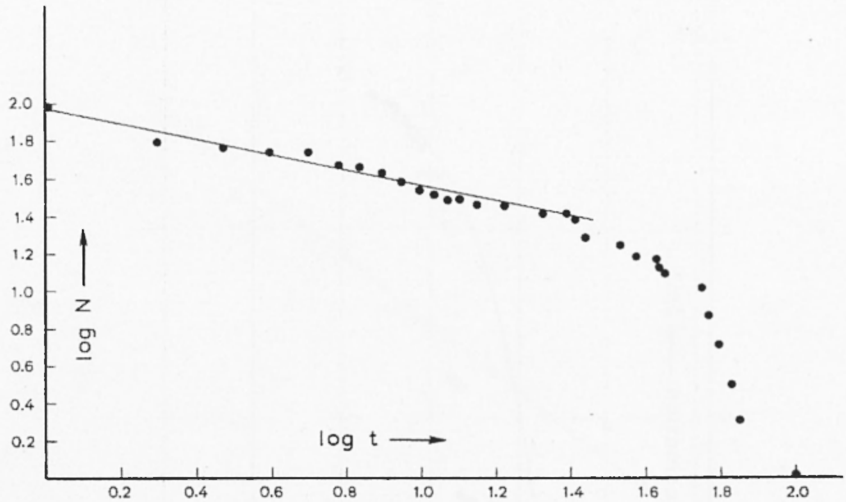

Fig. 20 - Time distribution of the aftershocks of the Shophades Earthquake of April 30, 1954.

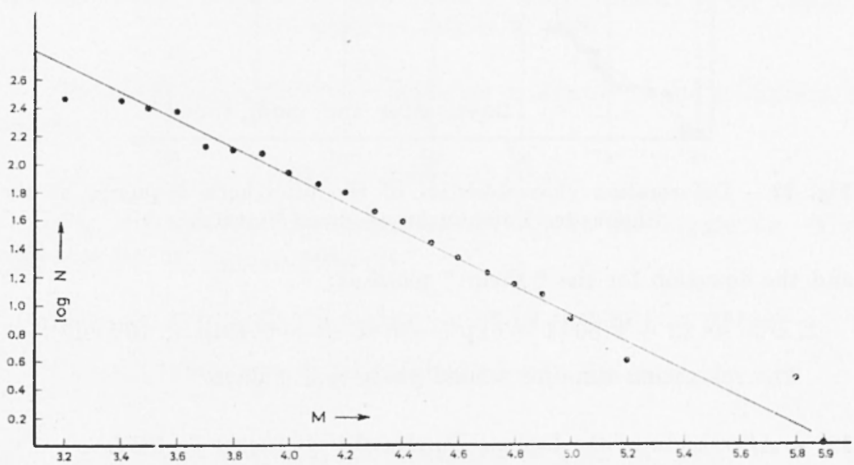

Fig. 21 - Distribution of the Magnitudes of the aftershocks of the Shophades Earthquake of April 30, 1954.

The deformation characteristics are shown in Figure 22. The compressional phase is expressed by the:

$$\Sigma D = (0.17 + 0.10 \log t) \times 10^{14} \text{ cm}^3,$$

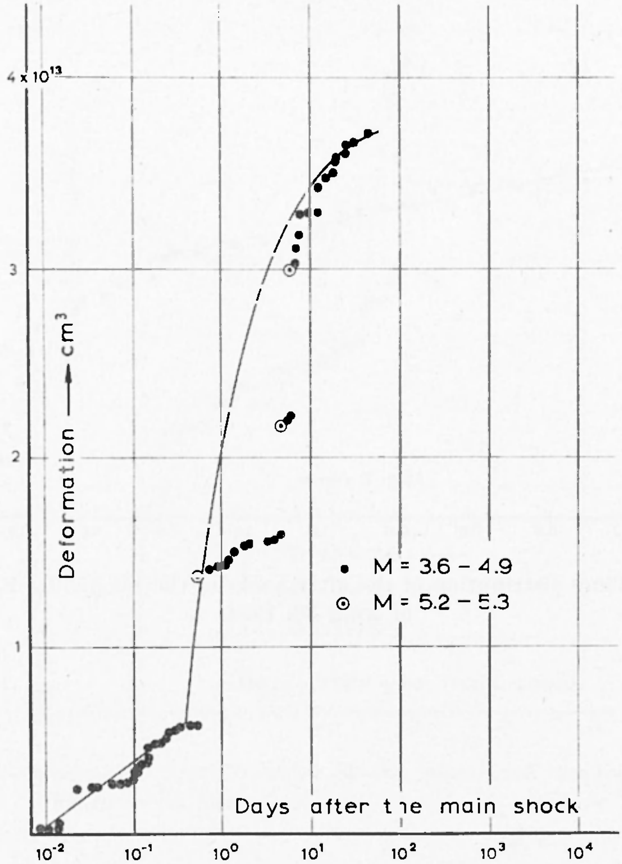

Fig. 22 – Deformation characteristics of the aftershock sequence of the Shophades Earthquake of April 30, 1954.

and the equation for the " shear " phase is:

$$\Sigma D = \{0.22 + 1.80 [1 - \exp(- 0.86 \sqrt{t - 0.40})]\} \times 10^{14} \text{ cm}^3 .$$

The relaxation time for second phase is 3.4 days.

19. – *Aftershocks of the Lemnos Earthquake of August 3, 1954.*

The epicenter of the main shock is close to the Northern coast of the Lemnos island. Its magnitude is 6.1. Twenty one aftershocks of magnitude $4.0 \leq M \leq 5.5$ have been recorded in Athens. The dates, arrival times and magnitudes are listed in Table III-(19). The time distribution of the aftershocks of this sequence is expressed by the:

$$\log N = 1.33 - 0.54 \log t \qquad t \leq 80 \text{ days} .$$

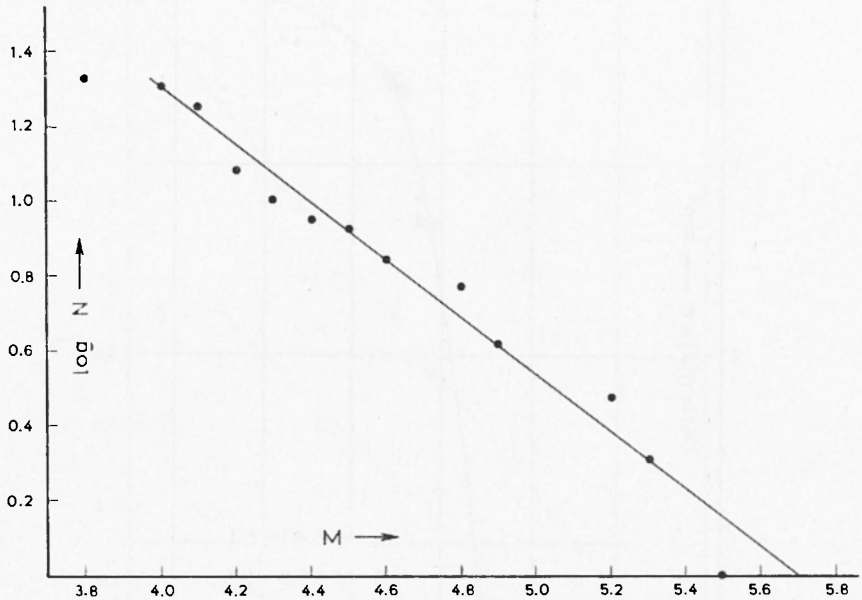

Fig. 23 - Distribution of the Magnitudes of the aftershocks of the Lemnos Earthquake of August 3, 1954.

The magnitude distribution is shown in Figure 23 and is expressed by the:

$$\log N = 4.68 - 0.86 M .$$

The deformation characteristics are shown in Figure 24. The equation for the second phase is:

$$\Sigma D = \{0.32 + 3.59 [1 - \exp (- 0.96 \sqrt{t} - 0.29)]\} \times 10^{13} \text{ cm}^3 .$$

The relaxation time for the second phase is 0.8 days.

20. - *Aftershocks of the Laconia Earthquake of April 13, 1955.*

The magnitude of this shock is 6. The largest aftershock has a magnitude of 4.3 and occurred at $04^h 22^m$ on April 14. This probably is the only aftershock of $M \geq 4$. The records of this earthquake show that its focus must be below the Mohorovicic discontinuity.

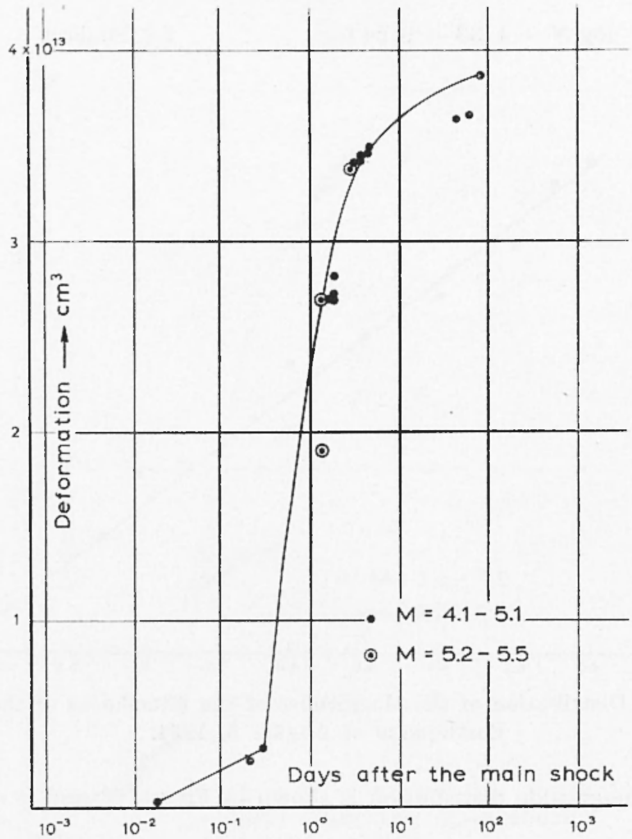

Fig. 24 - Deformation characteristic of the aftershock sequence of the Lemnos Earthquake of August 3, 1954.

21. - *Aftershocks of the Volos Earthquake of April 19, 1955.*

The epicenter of the main shock is in the Pagasitikos Gulf. It caused extensive damage in Magnesia. Its magnitude is $6^1/_4$. Seven foreshocks and forty two aftershocks of magnitude $3.3 \leq M \leq 5.9$, have been recorded in Athens. The dates, arrival times and magnitudes are listed in Table III-(21). In the same Table three " late aftershocks " are included.

The time distribution for all the aftershocks with magnitude $M \geq 4$ is expressed by the:

$$\log N = 1.01 - 0.40 \log t \qquad t \leqq 11 \text{ days} .$$

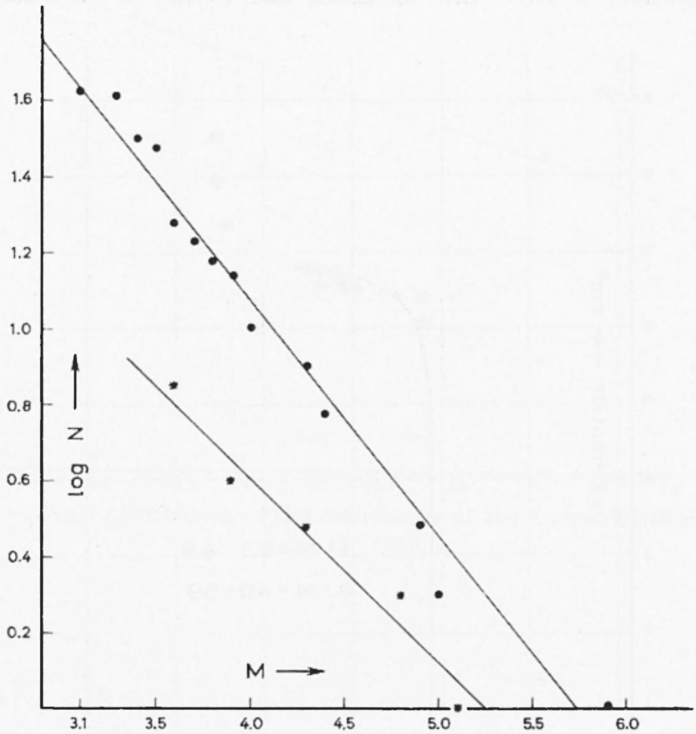

Fig. 25 – Distribution of the Magnitudes of the foreshocks and aftershocks of the Volos Earthquake of April 19, 1955.

The magnitude distribution of the aftershocks and foreshocks are shown in Figure 25 and are expressed by the:

$$\log N = 3.61 - 0.63\, M \qquad \text{Aftershocks}$$
$$\log N = 2.28 - 0.43\, M \qquad \text{Foreshocks} .$$

The deformation characteristics are shown in Figure 26. The equation for the second phase is:

$$\Sigma D = \{0.09 + 6.73\, [1 - \exp\,(- 3.32 \sqrt{t - 1.30})]\} \times 10^{13} \text{ cm}^3 .$$

The relaxation time for the second phase was found equal to 0.7 days.

22. – *Aftershocks of the Samos Earthquake of July 15, 1955.*

The epicenter of this shock is close to the Western coast of Turkey. Its magnitude is 6.8. One foreshock and twenty seven aftershocks

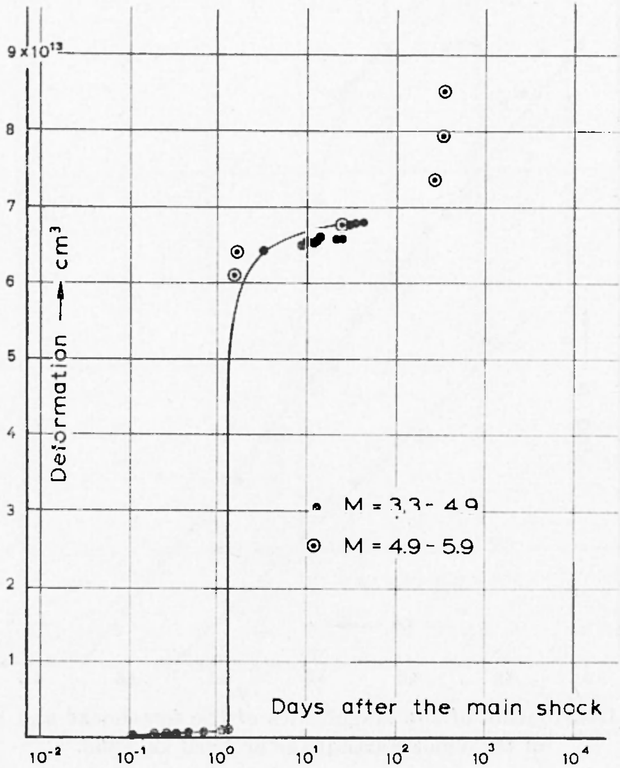

Fig. 26 – Deformation characteristics of the aftershock sequence of the Volos Earthquake of April 19, 1955.

of magnitude $4.0 \leq M \leq 5.2$ have been recorded in Athens. The dates, arrival times and magnitudes of these shocks are listed in Table III-(22).

The time and magnitude distribution of these aftershocks are shown in Figure 27 and 28 respectively and are expressed by the:

$$\log N = 1.42 - 0.33 \log t \qquad t \leq 213 \text{ days}$$

$$\log N = 7.49 - 1.45\, M .$$

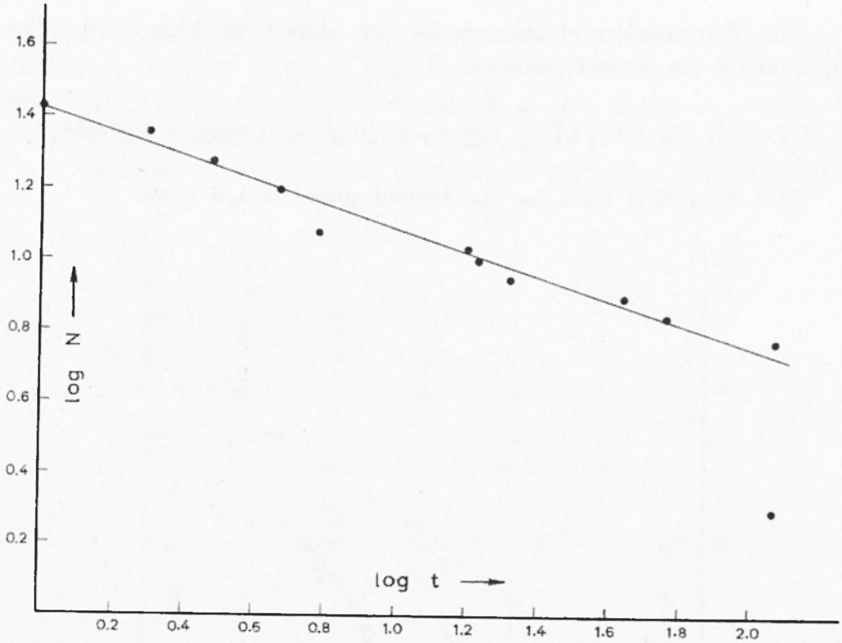

Fig. 27 – Time distribution of the aftershocks of the Samos Earthquake of July 15, 1955.

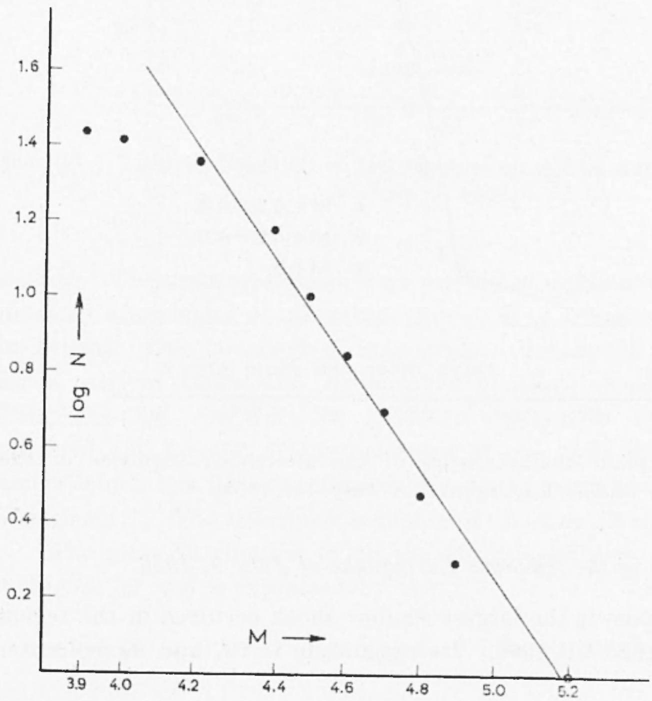

Fig. 28 – Distribution of the Magnitudes of the aftershocks of the Samos Earthquake of July 15, 1955.

The deformation characteristics are shown in Figure 29. The equation for the second phase is:

$$\Sigma D = \{1.73 + 5.74 \left[1 - \exp\left(-0.70 \sqrt{t - 0.50}\right)\right]\} \times 10^{13} \text{ cm}^3 .$$

The relaxation time for the second phase is 1.8 days.

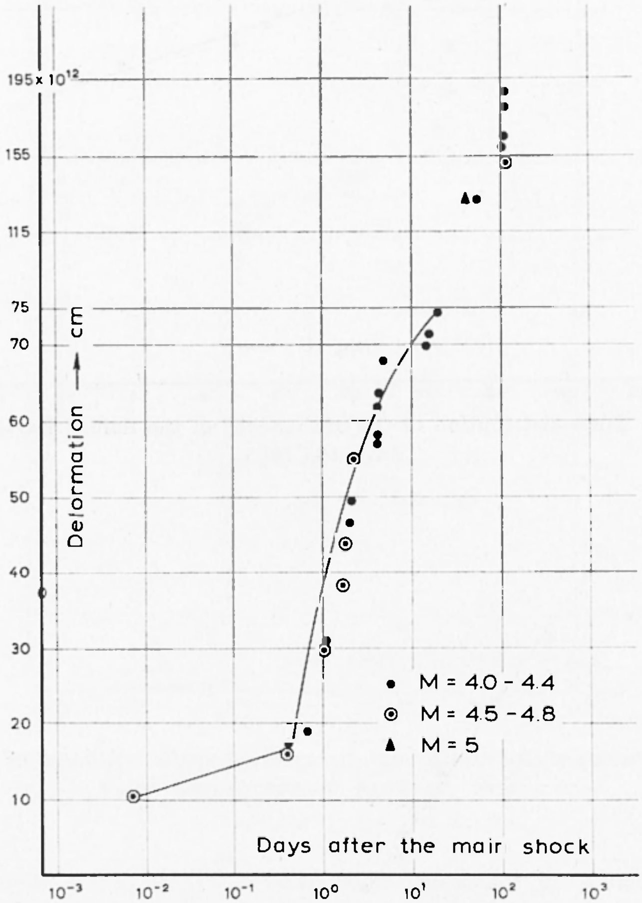

Fig. 29 – Deformation characteristics of the aftershock sequence of the Samos Earthquake of July 15, 1955.

23. – *Aftershocks of the Amorgos Earthquake of July 9, 1956.*

This earthquake is the largest shallow shock occurred in the region of Greece from 1926 till 1966. Its magnitude is $7^1/_2$ and its epicenter is close to Amorgos island. Twelve minutes after the main shock another earthquake occurred with magnitude probably a little larger than $6^3/_4$. This is the largest aftershock of this sequence. The epicenter of this shock is 70 km west of the epicenter of the main shock. These earthquakes caused severe damage and casualties in the Cyclades

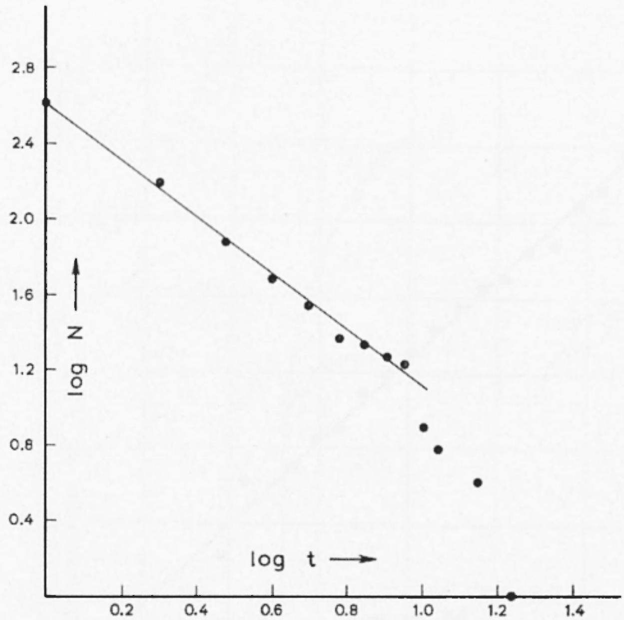

Fig. 30 – Time distribution of the aftershocks of the Amorgos Earthquake of July 9, 1956.

islands. The main aftershock sequence lasted eighteen days only. Four hundred aftershocks of magnitude $3.5 \leq M \leq 6^3/_4$ have been recorded in Athens. One foreshock of magnitude 5.0 occurred on July 8. The dates, arrival times and magnitudes of these shocks are listed in Table III-(23). On July 30, 1956, an earthquake of magnitude 6.1 occurred 100 km SE of the epicenter of the main shock. This earthquake which has its own aftershocks, can be considered as large "late aftershock". The aftershock sequence of this shock is studied separately.

The time distribution of all the aftershocks with $M \geq 4$ is shown in Figure 30 and is expressed by the:

$$\log N = 2.60 - 1.50 \log t \qquad t \leq 10 \text{ days.}$$

The cumulative frequency function of the magnitude is shown in Figure 31 and is expressed by the:

$$\log N = 5.8 - 0.92\ M\ .$$

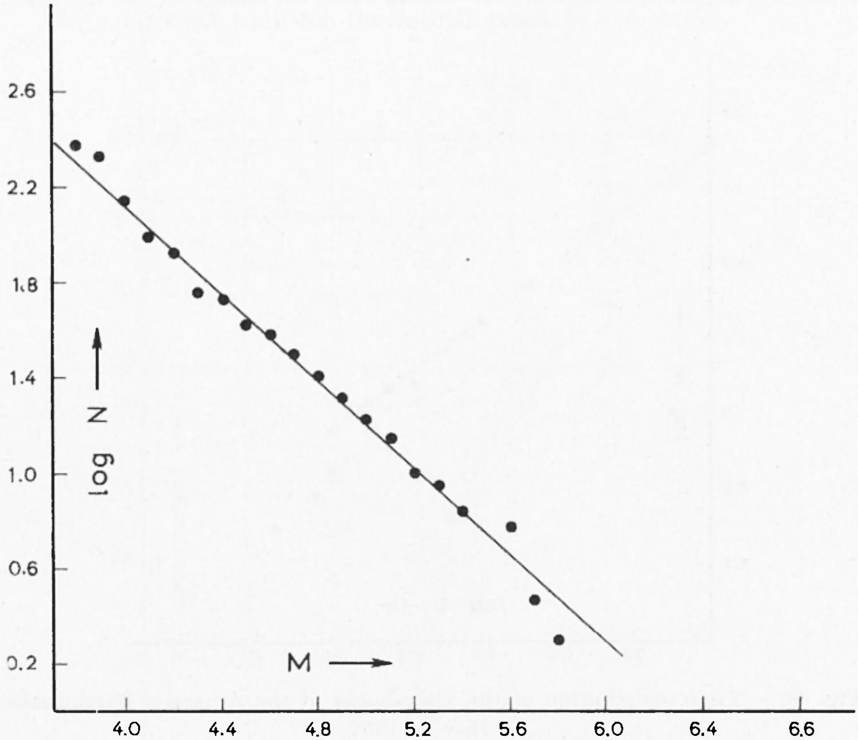

Fig. 31 – Distribution of the Magnitudes of the aftershocks of the Amorgos Earthquake of July 9, 1956.

The deformation characteristics are shown in Figure 32. The equations for the compressional and second phase are:

$$\Sigma D = (6.51 + 3.78 \log t) \times 10^{13}\ \mathrm{cm}^3$$

$$\Sigma D = \{21.16 + 3.15\,[1 - \exp(-2.48\,\sqrt{t - 0.12})]\} \times 10^{13}\ \mathrm{cm}^3\ .$$

The deformation during the occurrence of the largest aftershock is not plotted in Figure 32.

The relaxation time of the " shear phase " is 0.4 days.

24. – *Aftershocks of the NE Crete Earthquake of July 30, 1956.*

This earthquake can be considered as large " late aftershock " of the Amorgos Earthquake of July 9, 1956. Its magnitude is 6.1. About

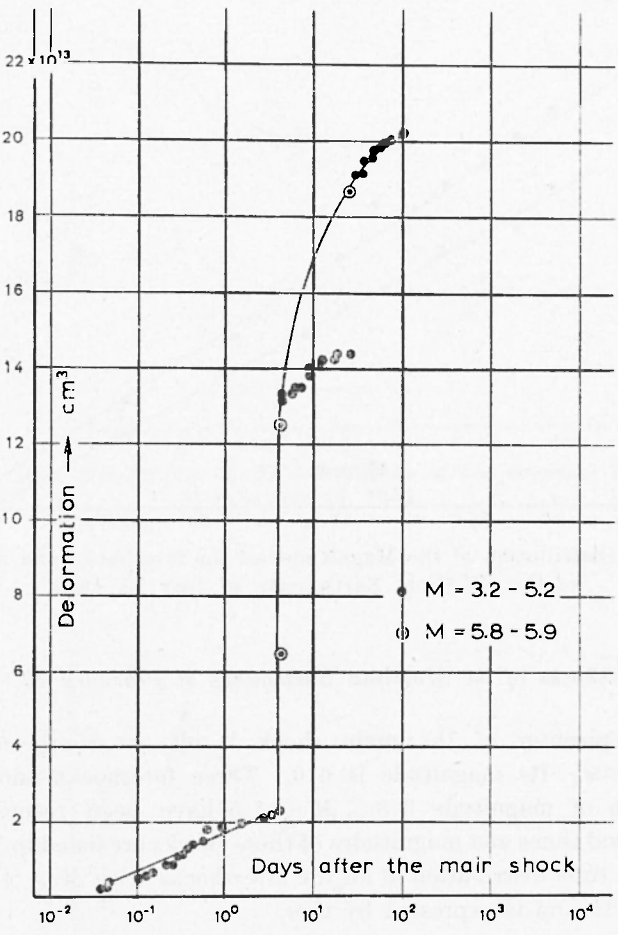

Fig. 32 – Deformation characteristics of the aftershock sequence of the Amorgos Earthquake of July 9, 1956.

eight foreshocks and nineteen aftershocks of magnitude $3.7 \leq M \leq 5.7$ have been recorded in Athens. The dates, arrival times and magnitudes are listed in Table III-(24). The cumulative distribution of the magnitude are shown in Figure 33 and are expressed by the:

$$\log N = 3.64 - 0.65\ M \qquad \text{Aftershocks}$$
$$\log N = 3.08 - 0.55\ M \qquad \text{Foreshocks}\ .$$

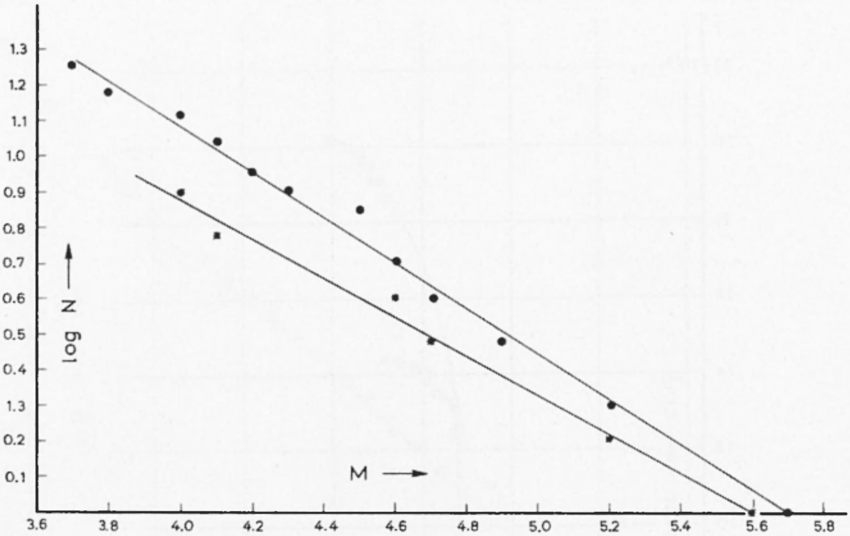

Fig. 33 – Distribution of the Magnitudes of the foreshocks and aftershocks of the NE-Crete Earthquake of July 30, 1956.

25. – *Aftershocks of the Messinia Earthquake of February 19, 1957.*

The epicenter of the main shock is off the Southern coast of Peloponnesus. Its magnitude is 6.0. Three foreshocks and thirteen aftershocks of magnitude $3.8 \leq M \leq 4.5$ have been recorded. The dates, arrival times and magnitudes of these shocks are listed in Table III-(25). The time distribution of all the aftershocks with $M \geq 4$ is shown in Figure 34 and is expressed by the:

$$\log N = 1.14 - 0.58 \log t \qquad t \leq 14 \text{ days}\ .$$

The cumulative distribution of the magnitude of the aftershocks is shown in Figure 35 and is expressed by the:

$$\log N = 5.39 - 1.14\ M\ .$$

The deformation characteristics for the second phase is expressed by the:

$$\Sigma D = \{0.2 + 2.1 [1 - \exp(-1.46 \sqrt{t - 0.05})]\} \times 10^{12} \text{ cm}^3 .$$

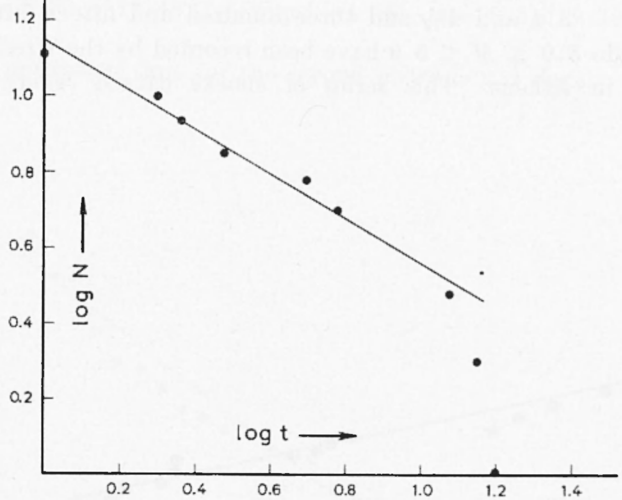

Fig. 34 – Time distribution of the aftershocks of the Messinia Earthquake of February 19, 1957.

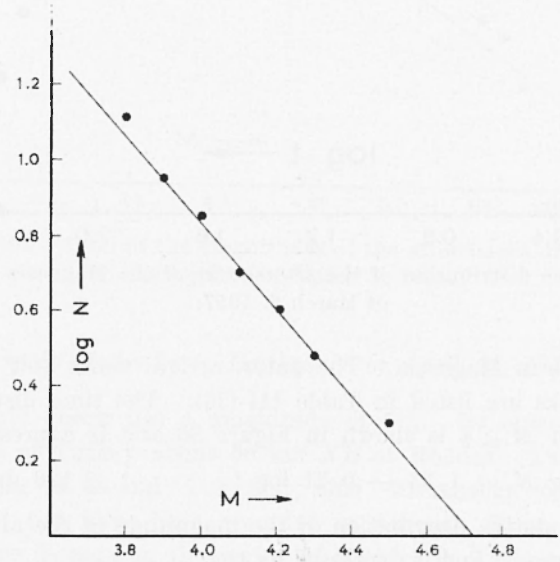

Fig. 35 – Distribution of the Magnitudes of the aftershocks of the Messinia Earthquake of February 19, 1957.

The relaxation time for the " shear phase " is equal to 1.64 days.

26. – *Aftershocks of the Magnesia Earthquake of March 8, 1957.*

The magnitude of the main shock is $6^3/_4$. Two foreshocks of magnitude $M = 3.4$ and $6^1/_2$ and three hundred and fifteen aftershocks of magnitude $3.0 \leqq M \leqq 5.9$ have been recorded by the Wiechert seismographs in Athens. This series of shocks caused severe damage

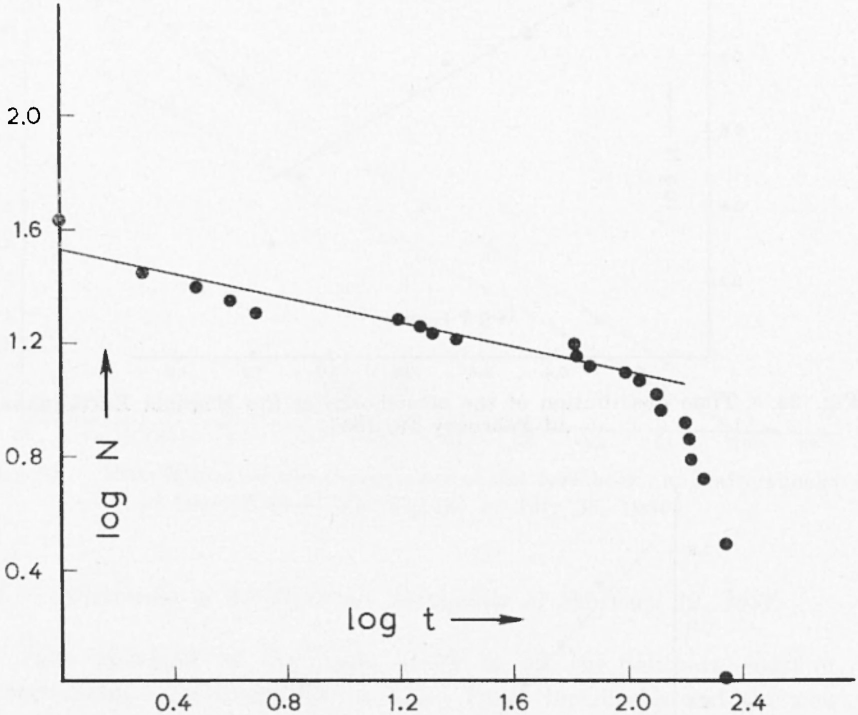

Fig. 36 – Time distribution of the aftershocks of the Magnesia Earthquake of March 8, 1957.

and casualties in Magnesia. The dates, arrival times and magnitudes of these shocks are listed in Table III-(26). The time distribution of aftershocks of $M \geqq 4$ is shown in Figure 36 and is expressed by the:

$$\log N = 1.53 - 0.21 \log t \qquad t \leqq 126 \text{ days} .$$

The cumulative distribution of the magnitude of the aftershocks is shown in Figure 37 and is expressed by the:

$$\log N = 4.61 - 0.73 M .$$

Deformation characteristics are shown in Figure 38. Three phases are observed. The third phase starts with a shock of $M = 5.8$ and consists of fifty one late aftershocks. The equation for the second phase is:

$$\Sigma D = \{0.33 + 12.48 \, [1 - \exp(-1.45 \sqrt{t - 0.3})]\} \times 10^{13} \text{ cm}^3 .$$

The relaxation time for the second phase is 2.2 days.

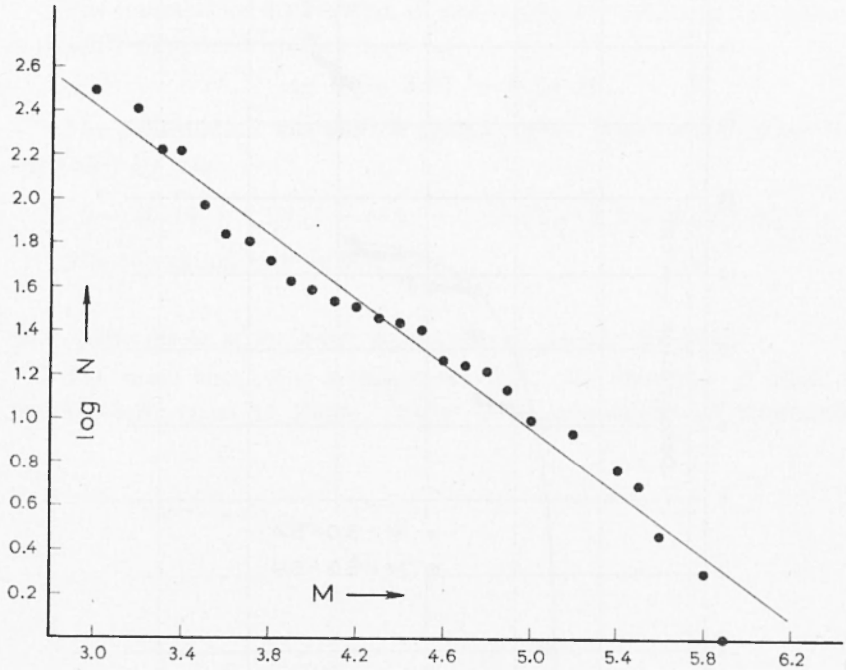

Fig. 37 – Distribution of the Magnitudes of the aftershocks of the Magnesia Earthquake of March 8, 1957.

27. – *Aftershocks of the Lycia Earthquake of April 25, 1957.*

The main shock has a magnitude of $7^1/_4$. Its epicenter is close to the coast of Turkey about 50 km *NE* of Rhodes. Two foreshocks of magnitude 4.6 and 7.0 and nine aftershocks of magnitude $4.3 \leq M \leq 6.3$ have been recorded in Athens. These earthquakes caused severe damage in the region of Fethiye in Turkey. The dates, arrival times and magnitudes of these foreshocks and aftershocks are listed in Table III-(27). The time distribution of the aftershocks is expressed by the:

$$\log N = 1.00 - 0.18 \log t \qquad t \leq 33 \text{ days} .$$

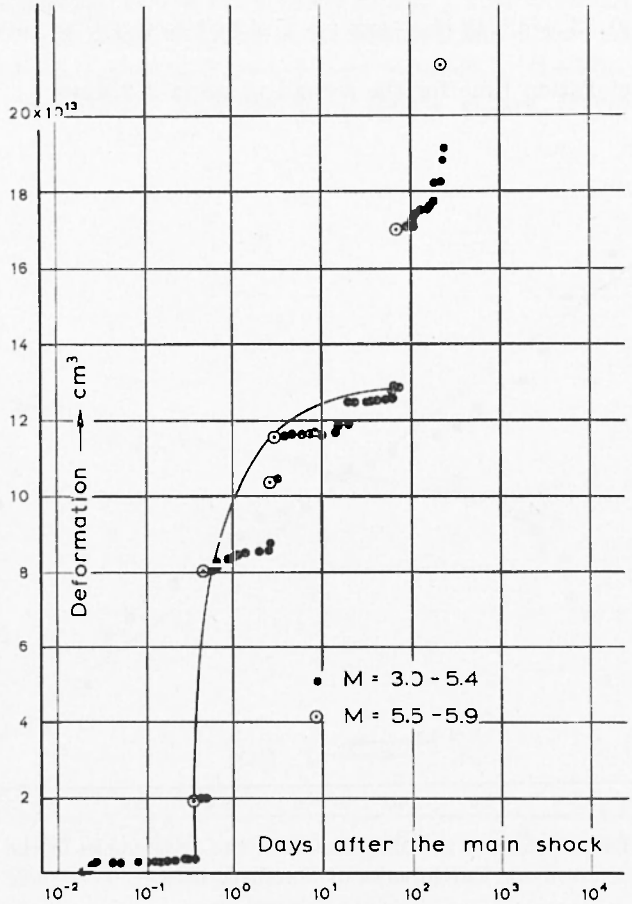

Fig. 38 - Deformation characteristics of the aftershock sequences of the Magnesia Earthquake of March 8, 1957.

The cumulative distribution of the magnitude of the aftershocks is expressed by the:

$$\log N = 3.52 - 0.59\, M .$$

The relaxation time is 2.3 days.

28. – *Aftershocks of the NE Turkey Earthquake of May 26, 1957.*

The magnitude of the main shock is 7.0. It caused severe damage in Bolu Province of Turkey. Fifteen aftershocks of magnitude $4.3 \leq M \leq 6.0$ have been recorded in Athens. The dates, arrival times and magnitudes are listed in Table III-(28). The time distribution of the aftershocks is approximately expressed by the:

$$\log N = 1.19 - 0.55 \log t \qquad t \leq 4 \text{ days} .$$

The cumulative distribution of the magnitude of these aftershocks is roughly expressed by the:

$$\log N = 3.87 - 0.64\, M .$$

The deformation was plotted against time. The " shear phase " is expressed by the;

$$\Sigma D = \{0.16 + 1.08\,[1 - \exp(-2.69\sqrt{t - 0.1})]\} \times 10^{14}\ \text{cm}^3 .$$

The relaxation time is 0.2 days.

29. – *Aftershocks of the Zante Earthquake of August 27, 1958.*

The main shock has a magnitude 6.5. Its epicenter is close to the Western coast of Zante. Fifty three aftershocks of magnitude

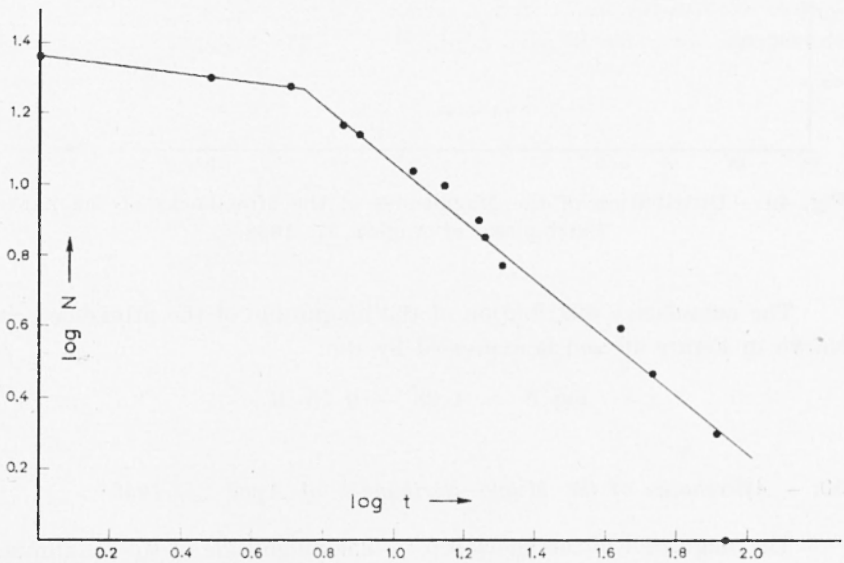

Fig. 39 – Time distribution of the aftershocks of the Zante Earthquake of August 27, 1958.

$3.4 \leq M \leq 5.6$ have been recorded by the Wiechert seismographs in Athens. The dates, arrival times and magnitudes are listed in Table III-(29). The time distribution of the aftershocks is shown in Figure 39 and is expressed by the;

$$\log N = 1.36 - 0.13 \log t \qquad t \leq 6 \text{ days}$$
$$\log N = 2.38 - 1.32 \log t \qquad 6 \leq t \leq 80 \text{ days.}$$

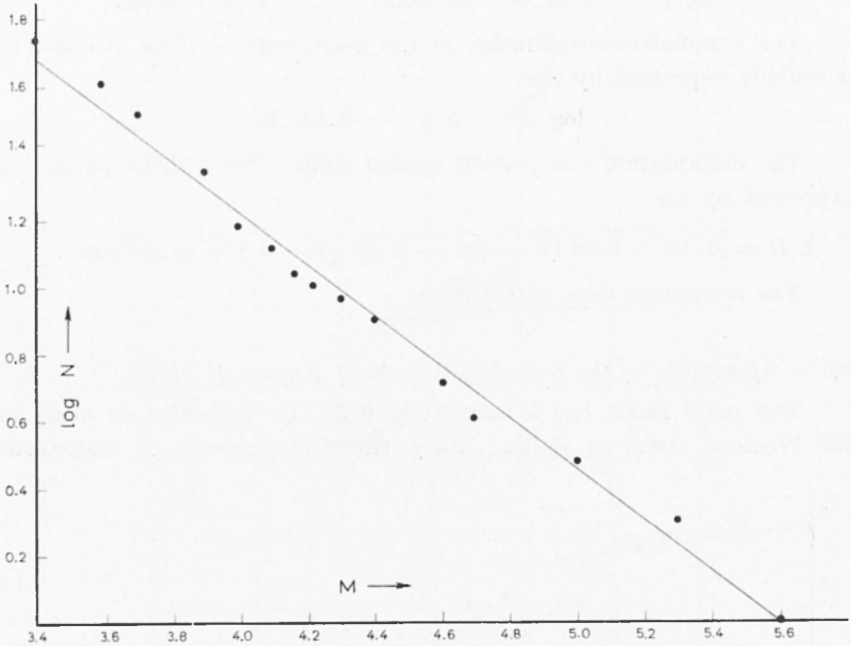

Fig. 40 – Distribution of the Magnitudes of the aftershocks of the Zante Earthquake of August 27, 1958.

The cumulative distribution of the magnitude of the aftershocks is shown in Figure 40 and is expressed by the:

$$\log N = 4.28 - 0.76 M .$$

30. – *Aftershocks of the Mugla Earthquake of April 25, 1959.*

The magnitude of this shock is $6^1/_4$. The magnitude of the maximum aftershock is 5.6. Other aftershocks of smaller magnitude have been also occurred but some of them have not been recorded in Athens because of the large epicentral distance and other have been recorded but they cannot be distinguished from other normal shocks.

31. – *Aftershocks of the Crete Earthquake of May 14, 1959.*

The magnitude of the main shock is 6.4. It caused extensive damage and casualties in Crete. One foreshock and six aftershocks are listed in Table III-(31).

32. – *Aftershocks of the Albanian Earthquake of September 1, 1959.*

The main shock has a magnitude of 6.4. Three foreshocks and six aftershocks of magnitude $4.1 \leq M \leq 6.0$ have been recorded by the Wiechert seismographs in Athens. The dates, arrival times and magnitudes of these shocks are in Table III-(32). The cumulative magnitude distribution is roughly expressed by the:

$$\log N = 2.40 - 0.40\, M\,.$$

33. *Aftershocks of the Zante Earthquake of November 15, 1959.*

The magnitude of the main shock is 7.0. This earthquake caused damage in Ionian islands. Eighteen aftershocks of magnitude

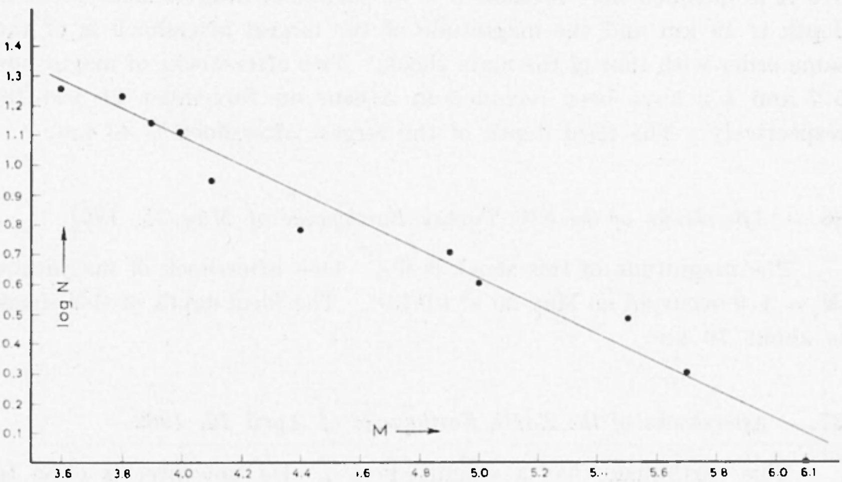

Fig. 41 – Distribution of the Magnitudes of the aftershocks of the Zante Earthquake of November 15, 1959.

$3.8 \leq M \leq 6.1$ have been recorded in Athens. The dates, arrival times and magnitudes of these earthquakes are listed in Table III-(33). The time distribution of all aftershocks of magnitude $M \geq 4$ is expressed by the:

$$\log N = 1.12 - 0.23 \log t \qquad t \leq 16 \text{ days.}$$

The magnitude distribution is shown in Figure 41. The curve which has the following equation fits the data:

$$\log N = 2.97 - 0.47\, M\,.$$

34. – *Aftershocks of the Albanian Earthquake of May 26, 1960.*

The magnitude of the main shock is 6.5. Three foreshocks and six aftershocks of magnitude $4.0 \leq M \leq 5.2$ have been recorded in Athens. The dates, arrival times and magnitudes of the shocks of this sequence are listed in Table III-(34). The cumulative distribution of the magnitude is expressed by the:

$$\log N = 2.72 - 0.52\, M\,.$$

35. – *Aftershocks of the Thesprotia Earthquake of November 4, 1960.*

Although the magnitude of this shock is 5.8, that is, smaller than 6.0 it is included here because it is of particular interest since its focal depth is 49 km and the magnitude of the largest aftershock is of the same order with that of the main shock. Two aftershocks of magnitude 5.7 and 4.2 have been recorded in Athens on November 11 and 16, respectively. The focal depth of the largest aftershock is 43 km.

36. – *Aftershocks of the SW Turkey Earthquake of May 23, 1961.*

The magnitude of this shock is $6^1/_2$. One aftershock of magnitude $M = 4.9$ occurred on May 25 at 01^h13^m. The focal depth of this shock is about 70 km.

37. – *Aftershocks of the Zante Earthquake of April 10, 1962.*

This earthquake has a magnitude $6^1/_4$. Its epicenter is close to the Southern coast of the Zante island. One hundred and thirty nine aftershocks of magnitude $3.6 \leq M \leq 5.3$ have been recorded by the

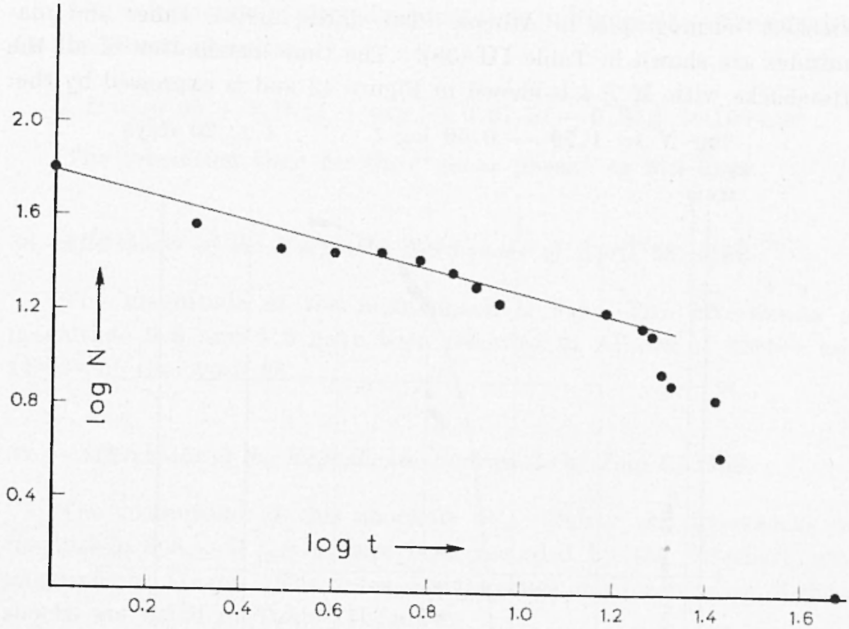

Fig. 42 – Time distribution of the aftershocks of the Zante Earthquake of April 10, 1962.

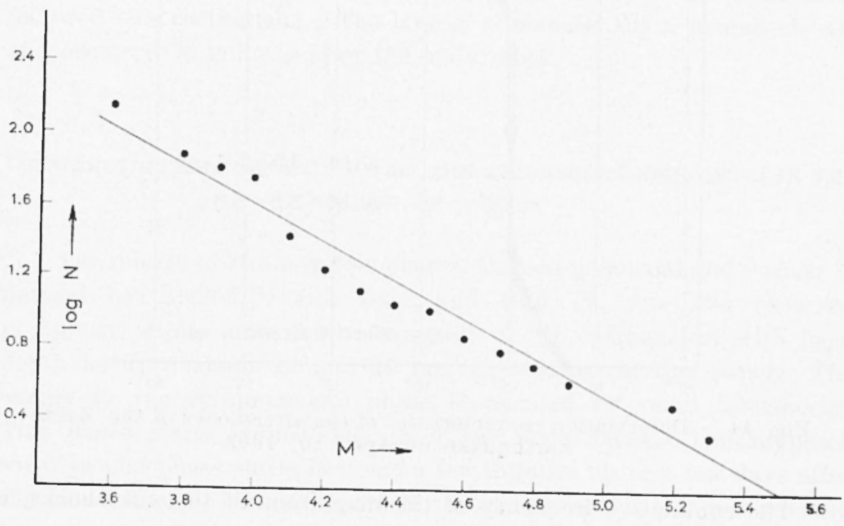

Fig. 43 – Distribution of the Magnitudes of the aftershocks of the Zante Earthquake of April 10, 1962.

Wiechert seismographs in Athens. The dates, arrival times and magnitudes are shown in Table III-(38). The time distribution of all the aftershocks with $M \geqq 4$ is shown in Figure 42 and is expressed by the:

$$\log N = 1.79 - 0.50 \log t \qquad t \leq 20 \text{ days} .$$

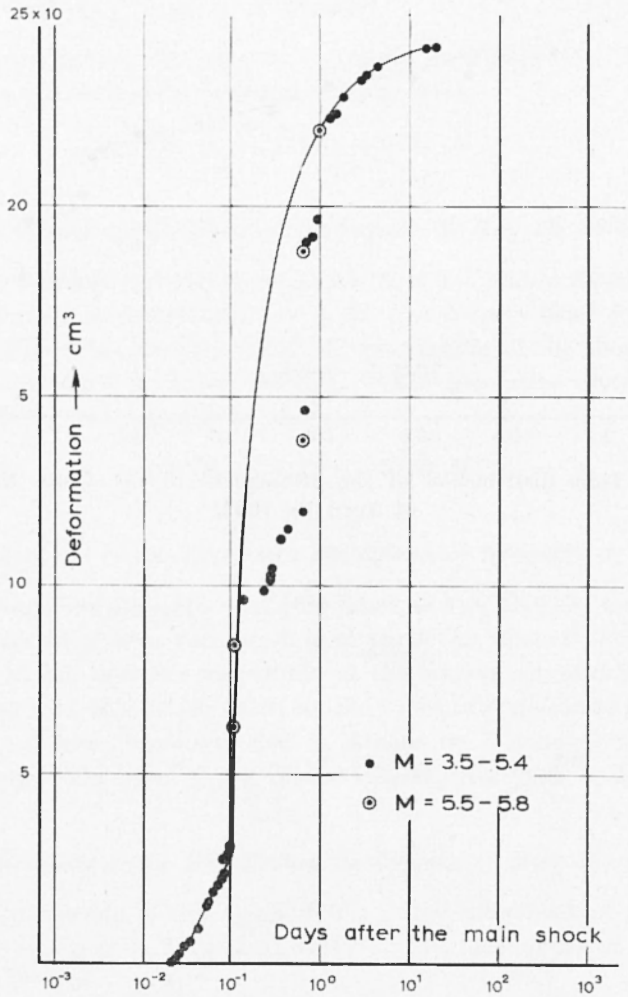

Fig. 44 – Deformation characteristics of the aftershocks of the Zante Earthquake of April 10, 1962.

The cumulative frequency of the magnitude of the aftershocks, is shown in Figure 43 and is expressed by the:

$$\log N = 5.88 - 1.07\ M .$$

The deformation is plotted against time in Figure 44. The equation for the second phase is:

$$\Sigma D = \{0.60 + 3.15 [1 - \exp (-0.67 \sqrt{t - 0.04})]\} \times 10^{13} \text{ cm}^3 .$$

The relaxation time for the "shear phase" is 2.5 days.

38. *Aftershocks of the Karpathos Earthquake of April 28, 1962.*

The magnitude of the main shock is 6.0. Two aftershocks of magnitude 5.8 and 4.5 have been recorded in Athens at 12^h44^m and 14^h02^m of the April 28.

39 – *Aftershocks of the Kephallenia Earthquake of July 6, 1962.*

The magnitude of this shock is $6^1/_4$. Thirty six aftershocks of magnitude $3.8 \leq M \leq 4.5$ have been recorded by the Wiechert seismographs in Athens. The dates, arrival times and magnitudes of these shocks are listed in Table III-(40).

40. – *Aftershocks of the Skopje Earthquake of July 26, 1963.*

The magnitude of the main shock is 6.2. Many small earthquakes followed this earthquake. The largest aftershock has a magnitude $4^3/_4$ and occurred 36 minutes after the main shock.

Deformation characteristics of the aftershock sequences in the region of Greece

The release of strain in two phases, the compressional and "shear", noticed by Benioff (2) and Båth and Duda (1), was also observed in almost all the aftershock sequences of the earthquakes with focal depth between about 15 and 50 km investigated in this paper. The energy in the compressional phase is released by small aftershocks. This phase starts immediately after the main shock. The supposed shear second phase starts between a few minutes up to a few days after the main shock. The most part of the energy in this phase is released by large aftershocks and mainly by the largest aftershock. The largest aftershock, which increases the destructive work of the main shock occurs, in all the cases a few minutes up to 14 days after the main shock. The mean value of the time of occurrence of the largest aftershock after the main shock is about 3 days.

The relaxation times of the second phase are distributed between 0.2 days and 6.5 days. The mean value is 2.0 days. Assuming that the relaxation time τ is related with the coefficient of viscocity η and the coefficient of rigidity μ by the $\tau = \frac{\eta}{\mu}$, a rough value for η can be found by applying this formula. The mean value of the focal depth of these earthquakes is about 40 km. The velocity of the shear waves at that depth is approximately equal to S_n velocity. If we take this velocity equal to 4.55 km/sec (Papazachos et al. [11]) and the density equal to 3.2 gr/cm^3 the value of μ must be 0.66×10^2 dynes/cm^2. Then the value of the coefficient of viscosity is equal to 10^{17} gr/sec-cm at a depth of about 40 km.

In the cases of the earthquakes which are listed in Table I with code numbers 4, 5, 8, 10, 11, 12, 13, 14, 17, 21, 22, 23, 26, and 32, that is, in about 30% of the cases a third phase was observed. The most part of the energy in this phase is released by the so called large " late aftershocks ". The largest " late aftershocks " in these fourteen cases occurred 222, 74, 41, 281, 69, 123, 50, 75, 69, 330, 43, 21, 219, and 36 days after the main shock.

The fact that the large " late aftershocks " have their own aftershocks indicates that they are at least partially, independent of the main shock. That is, the largest part of their aftershock region is not included in the aftershock volume of the main shock. This is supported by the fact that in most of the cases there is strong evidence that the epicenter of the large " late aftershock " differs from the epicenter of the main shock. It is probable that the main shock intervenes in part of the strained region of the large " late aftershock " and reduces the strength of this region by breaking through the barriers of some of its locks. The time when the major " late aftershock " occurs depends on the time needed for further stress accumulation till it reaches the remainder strenght of the material.

The large " late aftershocks " are particularly dangerous because they occur at time when the public believes that the serious danger is over. They usually cause considerable damage and casualties. It is not easy to locate regions which give large " late aftershocks " since as we can notice the earthquakes which have large " late aftershocks " are distributed all over the region considered, i.e. are independent of the surface geology. The probability for a major "late aftershock" to occur is greater in the case of large earthquakes. About 50% of the shallow earthquakes of $M \geqq 6^3/_4$ are followed by large "late aftershocks". In most of the cases the magnitude of the major "late aftershock" is of the same order with the magnitude of the largest normal aftershock but it can be smaller or larger.

Dependence of the number of aftershocks on the magnitude and focal depth of the main shock

It is known that the number of aftershocks increases as the magnitude of the main shock increases and depends also on the properties of the materials in the aftershock region and on the distribution of the applied stress. Since the properties of the material and distribution of stress change with depth it is reasonable to expect a dependence of the number of aftershocks on the focal depth of the main shock. Indeed, this number decreases with increasing depth.

An attempt is made here to find a tentative quantitative relation between the number of aftershock of $M \geqq 4$ and the magnitude and focal depth of the main shock. The accuracy of such anempirical relation depends on the accuracy of the focal depths and magnitudes, that are used to calculate the parameters of the relation and on the significance of the omitted terms on which the number of shocks also depend. Such terms depend on the horizontal variations of the properties of the material and the distribution of stress in the seismic region.

The method by which the focal depths and magnitudes were determined have been described previously. It is very difficult or even impossible to determine these quantities with accuracy. The best data that were at our disposal have been used for this purpose. Data were used only in cases when the depths determined from the times of several stations were distributed around one value with small scatter.

By the trial and error method the following two relations have been derived for depths between 14 and 40 km and between 41 and 70 km:

$$\log N_o = 0.95\,M - 0.025\,h - 4.22 \qquad 14 \leq h \leq 40 \text{ km} \qquad [40]$$

$$\log N_o = 0.95\,M - 0.035\,h - 3.75 \qquad 41 \leq h \leq 70 \text{ km} \qquad [41]$$

where N_o is the number of aftershocks with magnitude $M \geqq 4$, M is the magnitude of the main shock and h is the focal depth of the main shock in kilometers. The RMS error for both relations is $\pm$ 0.13. For focal depth smaller than about 14 km and larger than 70 km the number of aftershocks of $M \geq 4$ is very small. These two relations can be used to predict roughly the number of aftershocks with $M \geq 4$. When the number of aftershocks and the magnitude of the main shock are known they can be used to determine roughly the depth of focus.

Time distribution of the aftershocks in the area of Greece.

The number of aftershocks of $M \geq 4$ which occur after $t - 1$ days after the main shock is given in each case by a relation of the form:

$$N = N_o t^{-H} \qquad t < t_1 , \qquad [42]$$

where N_o is the total number of aftershocks of $M \geq 4$ and H is a constant. The mean values of H for the cases of earthquake with considerable number of aftershocks is 0.40 with a standard deviation $\pm$ 0.12. Since H does not vary largely the following relation gives roughly the time distribution of the aftershocks of $M \geq 4$ in the region of Greece, when the magnitude and focal depth of the main shock allow the occurrence of a considerable number of aftershocks:

$$N = N_o (M, h)\, t^{-0.40} \qquad t < t_1 , \qquad [43]$$

N_o is given by [40] or [41] and t_1 varies between a few days and a few months.

Dependence of the magnitude of the largest aftershock on the magnitude and focal depth of the main shock

The magnitude of the largest aftershock is plotted versus the magnitude of the main shock in Figure 45 for almost all the earthquakes with focal depth between about 14 and 55 km and magnitude $M \geq 5^3/_4$ occurred from 1926 till 1964 in the region considered. The following relation was found between the magnitude M_1 of the largest aftershock and the magnitude of the main shock:

$$M_1 = 1.07 + 0.71\, M . \qquad [44]$$

There are listed twenty nine cases in Galanopoulos' tables when earthquakes with magnitudes between $5^1/_4$ and $5^3/_4$ were followed by aftershocks. This data are also plotted in Figure 45 and are in agreement with the relation [44]. There are, however, cases when earthquakes with magnitude between $5^1/_4$ and $5^3/_4$ are not followed by recorded aftershocks. It means that when [44] is applied for this range of magnitude it gives an estimation of the largest possible expected aftershock. The data taken from Galanopoulos' tables are listed in Table II.

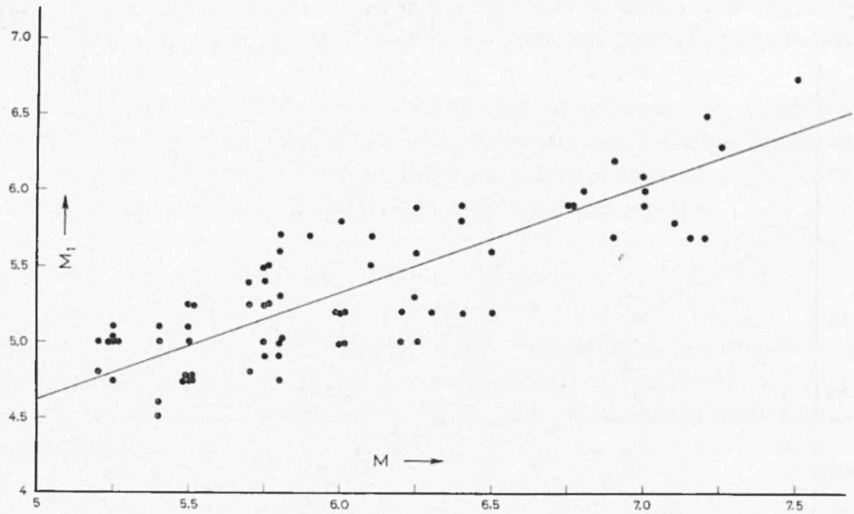

Fig. 45 – Dependence of the magnitude of the largest aftershock M_1 on the Magnitude of the main shock M.

The differences of the observed values of M_1 from those calculated by the formula [44] were computed. It was found that these differences are large for very small focal depth and decreases with depth up to about 15 km. Then it increases gradually up to a depth of about 42 km. At the depth of 42 km it decreases abruptly and after that it increases again gradually up to a depth of 70 km. For depths larger than 70 km this difference is very large. Assuming that the rate of change of the magnitude of the largest aftershock with the magnitude of the main shock is independent of the depth, the following two tentative relations have been derived for depths between 15 and 42 km and between 42 and 70 km:

$$M_1 = 0.71\,M - 0.046\,h + 2.12 \qquad 15 \leq h \leq 42 \qquad [45]$$

$$M_1 = 0.71\,M - 0.068\,h + 4.53 \qquad 42 \leq h \leq 70\,. \qquad [46]$$

Distribution of magnitudes of foreshocks and aftershocks in the area of Greece

The number N of aftershocks which have magnitude equal to and larger than M are given by the:

$$N = 10^{a-b'M} . \tag{47}$$

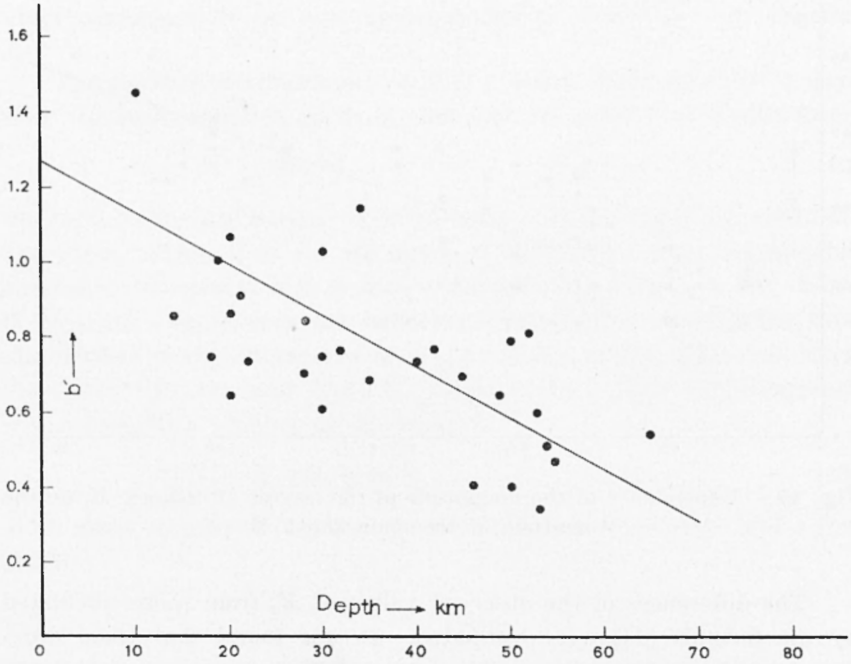

Fig. 46 – Dependence of the constant b' of the cumulative frequency function of the magnitude on the focal depth.

The values of the constant b' varies between 0.34 and 1.45. These values are plotted versus focal depth of the main shock in Figure 46. A clear decrease of the constant b' with depth is observed. This dependence of b' on the depth h, can be very roughly expressed by:

$$b' = 1.26 - 0.0135\, h \qquad 14 < h < 70 . \tag{48}$$

The decrease in b' with depth can be interpreted, according to Mogi's experimental results, as an increase of homogeneity with depth. Galanopoulos [3] studied the distribution of the magnitudes of the shallow as well as the intermediate earthquakes in the area of Greece. He also found larger values for the constant b' in the case of shallow earthquakes ($b' = 0.82$) than in the case of earthquakes with intermediate focal depth ($b' = 0.42$).

Some decrease of heterogeneity with depth is reasonable. The constant b' can be used as measure of the variation of the homogeneity of the material with depth. Comparison of this variation between areas with different structure can probably lead to very usefull geotectonical results.

The scattering in Figure 46 is large and can probably be attributed not only to errors introduced in b' and h but also to variation of b' with the geology of the different regions of the area considered.

If we put $M = 4$ in the relation [47] we can receive:

$$a = 4b + \log N_o ,$$

where N_o is given by [40] or [41]. That means that the constant a of the relation [47] depends on the properties of the material and symmetry of stress in the aftershock region and on the magnitude of the main shock.

Foreshocks.

In the cases of the earthquakes with code numbers 3, 5, 11, 15, 17, 18, 21, 22, 23, 24, 25, 26, 27, 31, 32, 34 one or more foreshocks were observed. This means that 40% of the large shallow earthquakes are preceded by one or more foreshocks with magnitude $M \geq 3.5$. In the cases of earthquakes with code numbers 17, 26 27 and 32 large foreshocks with magnitudes not much smaller than the magnitude of the main shock occurred, 2.0, 0.0, 0.3 and 14.5 days before the main shock. This means that when a large shallow earthquake occurs we must not exclude the possibility that this is not the main shock of the sequence and a larger earthquake may shortly follow. However, this probability is less than 10%.

Data for studying the cumulative distribution of the magnitudes of the foreshocks were available in the cases of the earthquakes with code numbers 17, 21 and 24 only. The values of the constant b' are 0.65, 0.43 and 0.55, respectively. Their differences from the corresponding values of the aftershocks are 0.20, 0.20 and 0.10.

DISCUSSION.

Values for the relaxation time could be found easily from the constant γ of the relations of the form [12] in each case. However, by the method used above the data are smoothed first and the adopted value of the relaxation time for each sequence is the arithmetic mean of many values.

The formula $\eta = \tau\mu$, is valid for a Maxwell's body when $\varepsilon' = 0$, or for a Kelvin's body. Thus, the values found in this paper for η, are approximately right since neither the material of the crust and uppermost part of the mantle have the properties of Maxwell's or Kelvin's body, nor the conditions under which this formula is valid are entirely fulfilled.

The accuracy of formulas [40], [41], [45] and [46] which relate the number of aftershocks and the magnitude of the largest aftershock with the magnitude and focal depth of the main shock is not high. The reasons for that are partly the errors introduced in calculating focal depths and magnitudes and the fact that terms depending only on these two quantities are not the only ones which determine the number of aftershocks and the magnitude of the largest aftershock. For example, horizontal variation of the properties of the material have an influence on the number of aftershocks and the magnitude of the largest aftershock.

Equation [43] is not valid when the focal depth is smaller than about 15 km or larger than about 50 km. Even in the cases of focal depths between 15 and 50 km exceptions are possible. Such an exception is the sequence of the Amorgos earthquake of July 9, 1956. In this case $H = 1.5$.

The values of b' have been calculated with $\Delta M = 0.1$. Trials, however, with $\Delta M = {}^1/_4$ in many cases shown that the influence of the choise of ΔM is not large in comparison with errors introduced from other cources.

The lack of considerable theoretical and laboratory work related to the problem of earthquake sequences, the difficulty to determine the space coordinates of the shocks, the difficulty to separate the small shocks of one sequence from individual small earthquakes and errors in measurements are the main causes of some weak points in this study.

SUMMARY AND CONCLUSIONS.

The foreshock and aftershock sequences of all the major shallow earthquakes ($M \geq 6$, $h \leq 70$ km) which occurred in the region of Greece from 1926 till 1964 have been investigated.

In studying the deformation characteristics of the aftershock sequences of these earthquakes the known phases, compressional and "shear", were observed in almost all cases, when the focal depth is between about 15 and 55 km. In about 30 % of the cases a third phase was noticed. The most part of the energy in this phase is released by the so called major "late aftershocks" which occur from about one month up to some months after the main shock. There is evidence that the aftershock region of the large "late aftershocks" is close to the aftershock region of the main shock but it is not entirely included in it. The mean relaxation time for the "shear phase" was found equal to 2.0 days. This gives a coefficient of viscosity equal to 10^{17} gr/sec-cm in a depth of about 40 km.

The largest aftershock of the "shear" phase which is usually the largest of all the aftershocks of the sequence occurs between a few minutes up to fourteen days after the main shock and its magnitude M_1 can be roughly predected by using the formula:

$$M_1 = 1.07 + 0.71\, M\,;$$

where M, is the magnitude of the main shock. For a more accurate prediction, knowledge of the depth of the focus is necessary. For constant magnitude of the main shock the magnitude of the largest aftershock has a maximum value in a depth of about 15 km and gradually decreases up to a depth of about 42 km where it increases abruptly and then it decreases gradually up to a depth of about 70 km. For depths smaller than 15 km or larger than 70 km the magnitude of the largest aftershock is small. The magnitude of the major "late aftershock" is usually of the same order with the magnitude of the largest aftershock of the sequence but it can be smaller or larger than that.

The formula $N = N_o\,(M, h)\, t^{-0.4}$ where $t < t_1$, describes roughly the time distribution of the aftershocks with $M \geq 4$ when the magnitude and focal depth of the main shock is such that a considerable number of large aftershocks occur: N is the number of aftershocks ($M \geq 4$) which occur after $(t - 1)$ days after the main shock: N_o is the total number of aftershocks with $M \geqq 4$, which depends on the magnitude and focal depths of the main shock. N_0 increases with magnitude. For constant magnitude, N_0 is the largest in a depth of about 15 km and it decreases up to the Mohorovičić discontinuity. From the Mohorovičić discontinuity up to 70 km the rate of decrease of N_0 is larger. Below the depth of about 70 km and above the depth of about 15 km the number of aftershocks with $M \geqq 4$ is very small: t_1 varies between a few days up to a few months.

A decrease of the constant b' of the cumulative frequency function of the magnitude with depth was observed. This is interpreted as an increase of the homogeneity of the material with depth.

The main shocks were preceded by one or more foreshocks in 16 cases. This means that 40% of the large shallow earthquakes are preceded by one or more foreshocks of magnitude $M \geqq 3.5$. The earthquakes which have foreshocks do not originate from certain regions but their epicenters are distributed all over the area considered. Data for studying the cumulative distribution of the magnitudes of the foreshocks were available in three cases only. It was found that in all three cases the constant b' of the foreshocks is smaller than that of the aftershocks of the same sequence. The mean value of this difference is approximately 0.2.

It can be generally concluded that: studies on foreshock and aftershock sequences can give information about some properties of the material (homogeneity, viscosity, etc.) and the distribution of stress in the aftershock region. Combination of observational, experimental and theoretical work on problems related with foreshock and aftershock sequences could turn out to be one of the powerful methods for studying the anatomy and physiology of the crust and uppermost part of the mantle and may contribute to the problem of earthquake prediction.

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Table I – The large shallow earthquakes occurred in the region of Greece from 1926 till 1964.

N°	DATE			h m s	φ	λ	depth	M	Location
1	March	18	1926	14 06 09	35° N	29° $^1/_2$ E	50*	6.9	S. Sporades
2	Sept.	19	»	01 03 57	36° N	22° E	42*	$6^1/_4$	Messinia
3	April	22	1928	20 13 46	38° N	23° E	(20*)	6.2	Corinth
4	Sept.	26	1932	19 20 37	40°5 N	23°7 E	28*	6.9	Chalkidike
5	March	1	1941	03 52 48	39°7 N	22°5 E	30	6.3	Larissa
6	Feb.	14	1943	07 28 22	38° N	20° E	50	6.0	Kephallenia
7	May	27	1944	23 52 30	36° N	27° $^1/_2$ E	30	6.2	Rhodes
8	Aug.	30	1947	22 21 31	35°1 N	23°4 E	22*	6.0	W. Crete
9	Oct.	6	»	19 55 37	36°9 N	22°0 E	(65*)	7.0	Messinia
10	Feb.	9	1948	12 58 15	35° $^1/_2$N	27°0 E	35	7.1	Karpathos
11	April	22	»	10 42 41	38° $^1/_2$N	20° $^1/_4$ E	40	6.4	Leukas
12	July	23	1949	15 03 30	38°6 N	26°3 E	52*	6.8	Oenoussae
12*b*	April	5	1951	03 15 22	37°4 N	20°0 E	(15)	6.1	Zante
13	Dec.	17	1952	23 03 57	34°4 N	24°5 E	53*	$6^3/_4$	SW Crete
14	March	18	1953	19 06 13	40°0 N	27°3 E	(50*)	7.2	NW Turkey
15	May	2	»	18 37 38	38°7 N	26°5 E	28	6.0	Lesbos
16	June	3	»	16 06 33	40°0 N	28°0 E	42*	6.0	NW Turkey
17	Aug.	12	»	09 23 49	38°1 N	20°8 E	14	7.2	Kephallenia
18	April	30	1954	13 02 36	39°3 N	22°2 E	19	7.0	Shophades
19	Aug.	3	»	18 18 10	40°2 N	25°0 E	20	6.1	Lemnos
20	April	13	1955	20 45 46	37°3 N	22°6 E	65*	6.0	Laconia
21	April	19	»	16 47 19	39°3 N	23°1 E	20	$6^1/_4$	Magnesia
22	July	16	»	07 07 10	37°6 N	27°2 E	14	6.8	Samos
23	July	9	1956	03 11 40	36°7 N	25°8 E	21	$7^1/_2$	Cyclades
24	July	30	»	09 14 57	35°9 N	26°0 E	45	6.0	NE Crete
25	Feb.	19	1957	07 43 59	36°2 N	21°6 E	34	6.0	Messinia
26	March	8	»	12 21 13	39°3 N	22°6 E	18	$6^3/_4$	Magnesia
27	April	25	»	02 25 42	36°5 N	28°6 E	53	$7^1/_4$	Lycia
28	May	26	»	06 33 30	40°7 N	31°2 E	49*	7.0	NE Turkey
29	Aug.	27	1958	15 16 34	37°8 N	20°5 E	32	6.5	Zante
30	April	25	1959	00 26 39	37°0 N	28°5 E	20	$6^1/_4$	SV Turkey
31	May	14	»	06 36 55	35° $^1/_2$N	24° $^1/_2$ E	49*	6.4	NW Crete
32	Sept.	1	»	11 37 40	40°9 N	19°8 E	46*	6.4	Albania
33	Nov.	15	»	17 08 41	37°8 N	20°5 E	55*	7.0	Zante
34	May	26	1960	05 10 11	40°6 N	20°6 E	54*	$6^1/_2$	Albania
35	Nov.	5	»	20 20 54	39°4 N	20°5 E	46	5.8	Thesprotia
36	May	23	1961	02 45 19	36°8 N	28°7 E	70	6.5	SW Turkey
36*b*	Jan.	26	1962	08 17 40	35°1 N	22°8 E	<15	$6^1/_4$	Crete
37	March	18	»	15 30 33	40°6 N	19°5 E	<15	$6^1/_4$	Albania
38	April	10	»	21 37 13	37°6 N	20°1 E	20	$6^1/_4$	Zante
39	April	28	»	11 18 53	36°1 N	27°0 E	44	6.4	Karpathos
40	July	6	»	09 16 15	38°2 N	20°2 E	30	$6^1/_4$	Kephallenia
41	July	26	1963	04 17 11	42°1 N	21°5 E	5	6.2	Skopje
42	Dec.	16	»	13 48 37	37°3 N	20°9 E	<15	6.2	Zante
43	Oct.	6	1964	14 32 25	40°0 N	28°0 E	<15	7.0	NW Turkey

Table II – MAGNITUDE OF THE LARGEST AFTERSHOCK M_1 OF GREEK EARTHQUAKES WHICH HAVE MAGNITUDES BETWEEN 5.2 AND 6.0.

N°	DATE			LOCATION	M	M_1
1	March	24	1927	East Crete	5.5	5.0
2	March	3	1928	Astypalaea	$5^3/_4$	5.0
3	April	17	1930	Corinthia	$5^3/_4$	5.0
4	September	11	1931	Euboea	$5^1/_4$	5.0
5	June	29	1932	Karpathos	5.4	5.1
6	March	22	1933	Kephallenia	5.4	4.5
7	September	3	1935	Thesprotia	$5^1/_4$	5.0
8	July	20	1938	Attica	$5^3/_4$	5.4
9	December	26	»	Zante	5.4	5.0
10	May	31	1939	Achaia	$5^1/_4$	5.1
11	July	28	»	Crete	$5^1/_4$	5.0
12	May	14	1941	Magnesia	5.7	5.4
13	June	1	1942	Larissa	5.3	$4^3/_4$
14	January	7	1943	Kephallenia	5.5	5.1
15	May	22	»	Kephallenia	5.2	5.0
16	September	23	1950	SE Crete	5.8	5.3
17	January	9	1951	Leukas	$5^1/_4$	5.0
18	August	31	»	NW Crete	$5^3/_4$	5.6
19	December	20	»	Kephallenia	5.2	4.8
20	October	5	1952	Zante	$5^3/_4$	4.5
21	June	3	1953	NW Turkey	$5^3/_4$	$5^1/_4$
22	March	9	1954	Kephallenia	$5^1/_2$	$4^3/_4$
23	May	1	»	Samos	$5^1/_2$	$4^3/_4$
24	May	3	»	Messinia	5.4	4.6
25	July	18	»	Elis	$5^1/_2$	$4^3/_4$
26	December	23	»	Elis	5.9	5.7
27	July	9	1955	Pelle	$5^1/_2$	$5^3/_4$
28	May	18	1956	Larissa	5.8	5.0
29	August	16	»	Messinia	5.5	$5^3/_4$
30	September	6	»	NE Crete	5.7	$5^1/_4$
31	October	30	1957	Karpathos	5.7	4.8
32	October	30	»	Rhodes	$5^3/_4$	4.9
33	January	2	1958	Laconia	5.8	4.9
34	April	3	»	W Albania	$5^3/_4$	$5^1/_4$
35	September	4	»	Astypalaea	$5^1/_2$	$4^3/_4$
36	January	1	1960	Asia Minor	$5^1/_4$	$4^3/_4$
37	February	23	»	Preveza	$5^1/_2$	$5^1/_4$
38	January	19	1961	Phokis	5.5	$5^1/_4$
39	February	23	»	Dodecanisa	$5^1/_4$	5.0

Table III – Aftershocks and foreshocks of the large earthquakes which occurred in the region of Greece from 1926 till 1964.

1. – Southern sporades 1926

N°	DATE	arr. time h m	*M*	N°	DATE	arr. time h m	*M*
MS	March 18 1926	14 07	6.9	10	March 24 1926	07 05	5.7
1	» » »	17 54	5.4	11	» 25 »	21 50	4.3
2	» » »	22 29	4.1	12	» 28 »	21 43	5.0
3	» » »	23 29	4.3	13	» 31 »	15 08	4.8
4	» 19 »	00 29	5.3	14	April 1 »	05 04	4.6
5	» » »	22 50	4.1	15	» 19 »	19 18	4.4
6	» 20 »	00 01	3.9	16	» 20 »	22 29	4.5
7	» 21 »	22 05	5.2	17	» 22 »	07 13	5.0
8	» 22 »	03 10	4.1	18	» 23 »	11 06	4.1
9	» 23 »	02 00	5.0				

2. – Messinia 1926

N°	DATE	arr. time h m	*M*	N°	DATE	arr. time h m	*M*
MS	Sept. 19 1926	01 04	6.2	6	Sept. 19 1926	06 10	3.7
1	» » »	01 (34)	4.1	7	» » »	06 27	4.6
2	» » »	03 14	3.8	8	» » »	08 37	3.7
3	» » »	03 40	3.8	9	» » »	08 57	4.1
4	» » »	04 34	4.1	10	» » »	14 04	3.8
5	» » »	04 54	3.5	11	» » »	14 38	5.0

3. – Corinth 1928

N°	DATE	arr. time h m	*M*	N°	DATE	arr. time h m	*M*
1	April 22 1928	19 59	5.3	9	April 29 1928	09 49	5.2
MS	» » »	20 14	6.2	10	» 30 »	00 33	5.0
1	» » »	21 17	5.0	11	» » »	08 20	5.2
2	» 23 »	10 49	5.0	12	May 1 »	13 34	4.6
3	» 24 »	01 15	5.0	13	» 17 »	09 24	4.2
4	» » »	05 48	5.2	14	» 30 »	12 31	4.3
5	» » »	14 39	4.5	15	» 31 »	06 19	4.2
6	» » »	19 13	4.4	16	June 7 »	12 54	5.0
7	» 25 »	00 31	5.2	17	» 10 »	13 29	4.1
8	» » »	19 53	5.0	18	July 20 »	18 30	4.6

4. – Chalkidike 1932-1933

N°	DATE	arr. time h m	*M*	N°	DATE	arr. time h m	*M*
MS	Sept. 26 1932	19 21	6.9	9	Sept. 28 1932	21 58	4.7
1	» » »	21 26	5.8	10	» 29 »	03 58	6.2
2	» 27 »	11 20	4.7	11	» » »	04 43	4.2
3	» 28 »	11 24	4.2	12	» » »	06 52	4.9
4	» » »	12 56	4.1	13	» » »	12 09	4.1
5	» » »	15 16	4.3	14	» » »	19 58	4.0
6	» » »	15 28	4.0	15	» » »	21 45	4.6
7	» » »	16 52	5.7	16	» » »	22 01	4.2
8	» » »	18 44	4.2	17	» 30 »	01 42	(3.7)

Table III – (continued)

N°	DATE			arr. time h	m	M	N°	DATE			arr. time h	m	M
18	Sept.	30	1932	03	58	(3.8)	59	Oct.	9	1932	00	44	4.1
19	»	»	»	07	03	4.1	60	»	»	»	00	57	(3.8)
20	»	»	»	07	31	4.8	61	»	»	»	06	25	5.0
21	»	»	»	07	39	4.7	62	»	»	»	11	38	(3.8)
22	»	»	»	08	00	3.9	63	»	»	»	22	18	(3.8)
23	»	»	»	08	23	(3.8)	64	»	»	»	22	29	4.4
24	»	»	»	09	48	4.2	65	»	10	»	01	34	3.9
25	»	»	»	09	50	4.2	66	»	»	»	10	32	4.0
26	»	»	»	10	52	4.0	67	»	11	»	12	57	3.8
27	»	»	»	11	38	4.1	68	»	12	»	02	59	4.9
28	»	»	»	11	59	4.5	69	»	»	»	11	45	4.3
29	»	»	»	19	32	4.4	70	»	»	»	21	09	(3.7)
30	Oct.	1	»	07	41	4.1	71	»	13	»	00	22	(3.8)
31	»	»	»	08	08	5.1	72	»	14	»	04	10	3.9
32	»	»	»	10	29	3.9	73	»	»	»	12	41	(3.4)
33	»	»	»	11	49	4.3	74	»	19	»	09	41	3.9
34	»	»	»	12	53	(3.7)	75	»	22	»	14	49	4.4
35	»	»	»	13	36	5.0	76	»	29	»	21	19	(3.7)
36	»	»	»	14	09	3.9	77	Nov.	1	»	16	20	5.6
37	»	»	»	14	22	(3.8)	78	»	10	»	19	22	4.1
38	»	»	»	21	11	4.3	79	»	16	»	13	45	4.1
39	»	2	»	03	29	(3.7)	80	»	19	»	14	(00)	3.9
40	»	»	»	04	04	4.2	81	Dec.	9	»	30	34	(3.4)
41	»	»	»	12	40	4.1	82	»	21	»	03	27	4.4
42	»	»	»	13	49	(3.8)	83	»	23	»	23	03	3.9
43	»	»	»	18	07	(3.8)	84	»	24	»	09	09	(3.8)
44	»	3	»	21	30	3.9	85	»	29	»	08	54	3.9
45	»	4	»	10	45	(3.5)	86	May	8	1933	01	14	5.0
46	»	»	»	15	00	(3.4)	87	»	11	»	19	10	6.3
47	»	»	»	15	03	(3.4)	88	»	12	»	12	54	(3.8)
48	»	»	»	15	40	(3.4)	89	»	»	»	14	20	(3.8)
49	»	»	»	15	46	3.9	90	»	31	»	19	53	(3.8)
50	»	»	»	20	24	(3.5)	91	»	»	»	19	56	4.9
51	»	5	»	01	10	3.6	92	June	1	»	02	41	5.1
15	»	»	»	05	42	3.8	93	»	3	»	18	00	(3.6)
53	»	»	»	07	11	4.0	94	»	22	»	02	57	(3.8)
54	»	6	»	12	54	3.9	95	July	2	»	12	18	(3.7)
55	»	»	»	14	31	(3.7)	96	»	»	»	12	21	4.8
56	»	7	»	08	51	(3.6)	97	»	4	»	04	19	3.9
57	»	8	»	23	33	4.1	98	»	19	»	20	09	5.0
58	»	»	»	23	34	(3.8)	99	Feb.	18	1935	06	41	4.8

5. – Larissa 1941

N°	DATE			arr. time h	m	M	N°	DATE			arr. time h	m	M
1	Jan.	2	1941	18	01	4.1	5	March	1	1941	07	53	5.2
MS	March	1	»	03	53	6.3	6	»	»	»	08	17	3.9
1	»	»	»	04	12	4.0	7	»	»	»	08	30	3.9
2	»	»	»	04	16	4.2	8	»	»	»	09	29	4.2
3	»	»	»	04	13	4.5	9	»	»	»	11	46	4.4
4	»	»	»	04	19	4.7	10	»	»	»	15	01	5.0

Table III – (continued)

N°	DATE	arr. time h m	*M*	N°	DATE	arr. time h m	*M*
11	March 1 1941	17 32	3.8	16	March 5 1941	23 03	3.8
12	» » »	20 00	3.8	17	» 19 »	12 07	4.0
13	» » »	20 51	4.0	18	May 14 »	08 37	5.7
14	» 3 »	13 00	4.4	19	» 16 »	01 28	5.4
15	» 4 »	16 17	3.8				

7. – Rhodes 1944

N°	DATE	arr. time h m	*M*	N°	DATE	arr. time h m	*M*
MS	May 27 1944	23 53	6.2	4	May 29 1944	15 32	5.0
1	» 28 »	02 16	4.3	5	» 30 »	17 54	4.8
2	» » »	02 22	4.5	6	» » »	19 37	4.3
3	» » »	05 44	4.4	7	June 22 »	02 (00)	4.3

8. – W. Crete 1947

N°	DATE	arr. time h m	*M*	N°	DATE	arr. time h m	*M*
MS	Aug. 30 1947	22 22	6.0	12	Aug. 31 1947	15 06	(3.1)
1	» » »	22 42	3.7	13	» » »	15 24	3.5
2	» » »	22 49	3.9	14	» » »	18 32	(3.3)
3	» » »	22 57	4.5	15	» » »	18 44	3.5
4	» 31 »	11 14	3.4	16	» » »	19 13	3.5
5	» » »	11 19	3.4	17	Sept. 1 »	22 34	3.6
6	» » »	11 38	3.3	18	» 5 »	11 42	3.6
7	» » »	13 08	3.8	19	» 6 »	21 00	3.9
8	» » »	13 29	4.2	20	Oct. 9 »	16 37	4.6
9	» » »	13 50	4.1	21	» » »	16 39	4.5
10	» » »	13 53	3.8	22	» 10 »	08 29	5.0
11	» » »	14 21	4.0				

9. – Messinia 1947

N°	DATE	arr. time h m	*M*	N°	DATE	arr. time h m	*M*
MS	Oct. 6 1947	19 56	7.0	6	Oct. 7 1947	19 21	4.8
1	» » »	23 08	3.5	7	» » »	19 29	5.1
2	» 7 »	03 21	3.6	8	» 8 »	00 14	3.6
3	» » »	05 04	3.5	9	» » »	05 40	3.7
4	» » »	05 13	3.5	10	» » »	06 (00)	4.2
5	» » »	05 29	3.7				

10. – Karpathos 1948

N°	DATE	arr. time h m	*M*	N°	DATE	arr. time h m	*M*
MS	Feb. 9 1948	12 59	7.1	9	Feb. 10 1948	15 59	5.3
1	» » »	14 45	4.6	10	» 11 »	02 07	4.4
2	» » »	15 55	4.6	11	» » »	02 45	4.3
3	» » »	18 07	4.4	12	» » »	09 21	4.9
4	» » »	20 52	4.3	13	» » »	11 22	4.5
5	» 10 »	00 11	4.4	14	» » »	15 21	4.5
6	» » »	03 52	4.4	15	» » »	17 50	4.5
7	» » »	04 32	4.3	16	» » »	18 03	5.1
8	» » »	14 24	4.9	17	» » »	18 08	5.1

Table III – (continued)

N°	DATE	arr. time h m	M	N°	DATE	arr. time h m	M
18	Feb. 11 1948	22 31	5.2	25	March 29 1948	02 34	5.6
19	» 12 »	12 15	4.9	26	July 26 »	11 26	4.9
20	» » »	22 28	5.6	27	» 28 »	08 18	5.2
21	» 13 »	08 15	5.1	28	Sept. 20 »	18 00	5.3
22	» 15 »	17 55	5.6	29	Oct. 18 »	09 00	5.8
23	» 20 »	22 12	4.9	30	» 19 »	03 04	5.1
24	March 26 »	03 09	5.3	31	» » »	13 19	4.4
				11. – LEUKAS 1948			
1	April 22 1948	00 43	5.4	10	April 24 1948	11 30	4.1
MS	» » »	10 43	6.4	11	» 25 »	14 43	3.8
1	» » »	14 05	3.4	12	» 26 »	01 12	4.1
2	» » »	15 33	4.5	13	» 28 »	19 20	3.9
3	» » »	15 (52)	4.4	14	» 29 »	21 47	3.9
4	» » »	17 02	4.5	15	» 30 »	03 10	3.8
5	» » »	18 (11)	3.8	16	May 4 »	14 26	3.8
6	» » »	22 (37)	3.8	17	June 30 »	12 22	6.3
7	» 23 »	05 39	5.2	18	» » »	12 38	3.8
8	» » »	13 34	3.7	19	» » »	12 46	3.8
9	» » »	17 59	3.8	20	» » »	13 18	4.5
				12. – OENOUSSAE 1949			
MS	July 23 1949	15 04	6.8	7	July 30 1949	18 11	4.4
1	» » »	15 56	4.5	8	» » »	21 45	4.7
2	» » »	15 59	4.1	9	» » »	22 49	4.0
3	» » »	16 02	4.8	10	Aug. 1 »	22 44	4.6
4	» 24 »	13 35	3.7	11	» 2 »	20 49	4.3
5	» 28 »	—	4.0	12	Nov. 23 »	16 51	6.0
6	» 30 »	17 48	5.2				
				13. – SW CRETE 1952			
MS	Dec. 17 1952	23 03	6.8	6	Dec. 31 1952	19 59	5 0
1	» 19 »	12 45	4.5	7	Jan. 1 1953	10 18	4.5
2	» 20 »	16 57	4.1	8	» 4 »	01 58	4.4
3	» 22 »	23 52	5.3	9	Feb. 7 »	22 32	6.0
4	» 31 »	14 49	5.7	10	» 8 »	02 40	5.0
5	» 31 »	17 19	5.9				
				14. – NW TURKEY 1953			
MS	March 18 1953	19 07	7.2	7	March 19 1953	02 45	4.4
1	» » »	20 22	(4.3)	8	» » »	03 28	4.5
2	» » »	21 19	5.8	9	» » »	12 09	4.5
3	» » »	21 46	4.3	10	» » »	12 55	5.0
4	» » »	22 29	4.4	11	» » »	14 05	4.3
5	» » »	23 20	4.5	12	» » »	21 15	5.5
6	» » »	23 30	4.3	13	» 20 »	19 43	4.3

Table III – (continued)

N°	DATE	arr. time h m	M	N°	DATE	arr. time h m	M
14	March 22 1953	13 18	4.6	18	March 26 1953	16 13	4.2
15	» 23 »	13 06	4.3	19	» 27 »	07 57	4.1
16	» 24 »	20 21	4.9	20	» 31 »	18 25	4.9
17	» 26 »	15 11	5.0	21	April 1 »	01 49	5.1
			15. – LESBOS 1953				
1	May 1 1953	20 07	5.1	4	May 3 1953	01 15	4.3
2	» 2 »	05 42	5.5	5	» 6 »	08 23	4.6
3	» » »	10 07	5.0	6	» 11 »	22 48	4.5
MS	» » »	18 38	6.0	7	» 12 »	16 15	4.1
1	» » »	21 37	3.8	8	» » »	16 20	4.1
2	» » »	22 34	4.0	9	» 14 »	13 01	5.1
3	» » »	22 44	4.1				
			16. – NW TURKEY 1953				
MS	June 3 1953	16 06	6.0	2	June 13 1953	07 08	3.9
1	» 9 »	16 29	5.2	3	» » »	07 04	4.2
			17. – KEPHALLENIA 1953-54				
1	Aug. 9 1953	07 42	6.3	27	Aug. 11 1953	13 47	4.9
2	» » »	08 58	4.2	28	» » »	13 59	4.6
3	» » »	09 30	4.2	29	» » »	14 10	4.0
4	» » »	10 33	4.4	30	» » »	14 16	4.0
5	» 11 »	03 33	6.8	31	» » »	14 32	4.0
6	» » »	03 48	4.7	32	» » »	14 39	3.9
7	» » »	04 01	4.7	33	» » »	15 44	4.1
8	» » »	04 33	4.7	34	» » »	16 10	4.1
9	» » »	05 07	4.0	35	» » »	16 35	4.0
10	» » »	05 12	4.3	36	» » »	16 57	4.0
11	» » »	05 36	3.9	37	» » »	17 44	4.0
12	» » »	05 39	4.0	38	» » »	19 46	4.6
13	» » »	05 43	4.0	39	» » »	20 53	4.0
14	» » »	05 51	4.3	40	» » »	21 25	4.7
15	» » »	05 56	5.1	41	» » »	21 49	4.0
16	» » »	07 01	3.9	42	» » »	22 02	4.0
17	» » »	07 04	3.9	43	» » »	22 12	4.5
18	» » »	08 05	4.0	44	» » »	23 46	4.1
19	» » »	09 28	4.8	45	» » »	23 53	4.0
20	» » »	10 38	4.4	46	» 12 »	00 58	4.1
21	» » »	10 46	4.0	47	» » »	06 09	5.4
22	» » »	11 31	4.0	48	» » »	06 28	4.3
23	» » »	11 49	4.7	49	» » »	06 54	4.4
24	» » »	12 36	4.0	50	» » »	07 43	4.0
25	» » »	12 44	5.4	MS	» » »	09 25	7.2
26	» » »	13 12	5.3	1	» » »	09 43	4.5

Table III – (continued)

Nº	DATE			arr. time h m		M	Nº	DATE			arr. time h m		M
2	Aug.	12	1953	09	51	4.4	53	Aug.	13	1953	02	15	4.3
3	»	»	»	09	56	4.3	54	»	»	»	02	58	4.3
4	»	»	»	10	05	4.0	55	»	»	»	03	23	5.7
5	»	»	»	10	07	4.5	56	»	»	»	04	21	4.3
6	»	»	»	10	08	5.6	57	»	»	»	04	50	4.2
7	»	»	»	10	23	4.4	58	»	»	»	05	13	4.6
8	»	»	»	10	25	4.7	59	»	»	»	06	02	4.4
9	»	»	»	11	34	5.7	60	»	»	»	06	29	4.0
10	»	»	»	11	47	4.6	61	»	»	»	07	03	4.0
11	»	»	»	12	06	6.5	62	»	»	»	08	16	4.4
12	»	»	»	12	15	5.0	63	»	»	»	10	17	5.6
13	»	»	»	12	19	4.9	64	»	»	»	11	33	4.1
14	»	»	»	12	25	4.3	65	»	»	»	11	59	3.9
15	»	»	»	12	26	4.3	66	»	»	»	12	01	4.7
16	»	»	»	12	49	4.6	67	»	»	»	12	17	4.2
17	»	»	»	13	40	6.0	18	»	»	»	12	57	4.6
18	»	»	»	13	52	4.4	69	»	»	»	13	26	4.5
19	»	»	»	13	56	4.3	70	»	»	»	13	50	4.6
20	»	»	»	14	09	6.1	71	»	»	»	14	44	5.4
21	»	»	»	14	37	4.2	72	»	»	»	14	52	4.0
22	»	»	»	15	11	4.8	73	»	»	»	16	05	3.9
23	»	»	»	15	18	4.0	74	»	»	»	17	20	4.1
24	»	»	»	15	22	4.8	75	»	»	»	17	48	4.2
25	»	»	»	15	28	4.0	76	»	»	»	17	48	4.3
26	»	»	»	15	37	4.0	77	»	»	»	18	20	3.9
27	»	»	»	16	02	4.0	78	»	»	»	18	40	3.9
28	»	»	»	16	09	5.7	79	»	»	»	19	05	4.3
29	»	»	»	16	27	4.6	80	»	»	»	20	10	4.7
30	»	»	»	17	10	4.8	81	»	»	»	20	28	4.1
31	»	»	»	17	11	4.1	82	»	»	»	21	03	3.8
32	»	»	»	17	50	4.2	83	»	»	»	21	27	3.8
33	»	»	»	17	54	5.1	84	»	»	»	21	56	4.2
34	»	»	»	18	59	4.4	85	»	»	»	22	32	4.0
35	»	»	»	19	20	4.3	85b	»	»	»	22	32	4.0
36	»	»	»	19	29	4.6	86	»	»	»	23	21	4.2
37	»	»	»	19	43	4.3	87	»	»	»	23	47	3.8
38	»	»	»	19	46	5.2	88	»	14	»	00	17	4.0
39	»	»	»	19	48	4.8	89	»	»	»	01	10	4.1
40	»	»	»	20	05	4.3	90	»	»	»	01	24	5.2
41	»	»	»	20	06	4.0	91	»	»	»	01	30	4.9
42	»	»	»	20	11	4.0	92	»	»	»	02	35	3.9
43	»	»	»	20	38	3.9	93	»	»	»	03	43	3.9
44	»	»	»	21	05	4.0	94	»	»	»	03	43	3.8
45	»	»	»	21	22	4.3	95	»	»	»	05	43	3.8
46	»	»	»	21	36	3.9	96	»	»	»	05	52	3.8
47	»	»	»	22	13	4.0	97	»	»	»	08	26	4.1
48	»	»	»	22	18	5.3	98	»	»	»	08	33	4.3
49	»	»	»	22	39	4.0	99	»	»	»	09	20	4.4
50	»	13	»	00	23	4.0	100	»	»	»	10	03	3.8
51	»	»	»	00	29	3.9	101	»	»	»	12	20	3.9
52	»	»	»	01	49	4.9	102	»	»	»	12	23	4.0

Table III – (continued)

N°	DATE			arr. time h	m	M	N°	DATE			arr. time h	m	M
103	Aug.	14	1953	12	28	4.0	154	Aug.	17	1953	11	47	3.6
104	»	»	»	16	20	4.0	155	»	»	»	12	13	3.6
105	»	»	»	16	47	3.8	156	»	»	»	12	38	3.9
106	»	»	»	21	37	4.4	157	»	»	»	14	52	4.2
107	»	»	»	22	32	4.6	158	»	»	»	15	02	4.4
108	»	»	»	22	42	4.4	159	»	»	»	20	32	3.9
109	»	15	»	02	10	3.9	160	»	»	»	21	49	3.9
110	»	»	»	02	38	3.8	161	»	»	»	23	14	3.9
111	»	»	»	02	49	4.0	162	»	18	»	04	56	4.5
112	»	»	»	03	50	4.5	163	»	»	»	09	40	3.8
113	»	»	»	04	28	4.3	164	»	»	»	11	51	4.1
114	»	»	»	04	42	4.0	165	»	»	»	12	09	3.9
115	»	»	»	07	05	4.0	166	»	»	»	12	38	3.8
116	»	»	»	07	28	3.8	167	»	»	»	12	45	3.9
117	»	»	»	08	20	4.0	168	»	»	»	14	39	4.0
118	»	»	»	09	41	4.6	169	»	»	»	20	29	4.3
119	»	»	»	09	51	3.9	170	»	»	»	20	31	3.8
120	»	»	»	11	47	4.0	171	»	»	»	21	13	3.8
121	»	»	»	12	15	4.0	172	»	»	»	22	44	5.0
122	»	»	»	14	20	3.6	173	»	19	»	00	55	4.9
123	»	»	»	14	37	4.0	174	»	»	»	01	13	4.2
124	»	»	»	15	49	4.0	175	»	»	»	01	41	3.6
125	»	»	»	22	16	3.9	176	»	»	»	02	16	4.3
126	»	»	»	23	02	4.5	177	»	»	»	02	17	4.3
127	»	»	»	23	31	3.8	178	»	»	»	03	18	5.0
128	»	»	»	23	33	4.9	179	»	»	»	03	48	3.6
129	»	16	»	02	50	3.8	180	»	»	»	04	05	4.3
130	»	»	»	03	18	3.8	181	»	»	»	08	01	4.5
131	»	»	»	03	31	5.0	182	»	»	»	08	31	3.9
132	»	»	»	09	13	4.1	183	»	»	»	09	25	3.9
133	»	»	»	18	40	4.0	184	»	»	»	11	02	4.0
134	»	»	»	19	16	3.9	185	»	»	»	11	04	4.4
135	»	»	»	21	23	3.8	186	»	»	»	11	37	4.0
136	»	»	»	21	45	4.1	187	»	»	»	11	49	4.1
137	»	»	»	21	47	4.6	188	»	»	»	13	19	4.3
138	»	»	»	22	16	4.2	189	»	»	»	14	21	3.9
139	»	»	»	22	20	4.6	190	»	»	»	16	17	4.2
140	»	»	»	23	37	4.3	191	»	»	»	16	30	3.9
141	»	»	»	23	42	4.3	192	»	»	»	16	59	3.8
142	»	17	»	00	03	4.1	193	»	»	»	19	36	4.6
143	»	»	»	00	13	3.9	194	»	»	»	19	38	4.6
144	»	»	»	00	25	4.9	195	»	»	»	21	21	3.6
145	»	»	»	02	13	5.3	196	»	»	»	23	11	4.6
146	»	»	»	02	45	4.6	197	»	»	»	00	54	3.6
147	»	»	»	03	36	4.0	198	»	»	»	01	29	3.6
148	»	»	»	04	15	3.8	199	»	20	»	04	40	3.7
149	»	»	»	09	07	4.0	200	»	»	»	04	56	4.4
150	»	»	»	10	21	5.0	201	»	»	»	05	07	3.8
151	»	»	»	10	43	4.0	202	»	»	»	08	06	4.4
152	»	»	»	10	57	3.9	203	»	»	»	09	09	4.0
153	»	»	»	11	41	4.0	204	»	»	»	11	14	3.8

Table III – (continued)

Nº	DATE			arr. time h	m	M	Nº	DATE			arr. time h	m	M
205	Aug.	20	1953	15	29	4.3	256	Sept.	3	1953	12	05	4.2
206	»	»	»	19	15	4.5	257	»	»	»	12	28	4.7
207	»	»	»	19	28	5.3	258	»	4	»	21	42	4.6
208	»	»	»	19	35	4.6	259	»	»	»	22	32	4.5
209	»	21	»	06	42	4.1	260	»	5	»	08	42	4.9
210	»	»	»	18	35	4.2	261	»	»	»	21	20	4.8
211	»	22	»	01	21	5.1	262	»	6	»	05	15	4.2
212	»	»	»	03	11	4.6	263	»	»	»	20	59	4.1
213	»	»	»	05	48	4.1	264	»	7	»	01	00	4.3
214	»	»	»	12	03	4.3	265	»	»	»	07	33	5.0
215	»	»	»	14	15	4.4	266	»	»	»	18	02	4.2
216	»	»	»	18	38	4.0	267	»	»	»	22	21	4.2
217	»	23	»	02	29	4.5	268	»	8	»	08	33	4.1
218	»	»	»	02	35	3.6	269	»	»	»	09	02	4.1
219	»	»	»	03	25	4.8	270	»	»	»	11	53	5.2
220	»	»	»	08	42	4.0	271	»	»	»	14	27	4.4
221	»	»	»	08	59	4.3	272	»	9	»	01	51	3.6
222	»	»	»	09	59	4.1	273	»	»	»	04	18	4.3
223	»	»	»	10	39	4.0	274	»	»	»	10	20	3.8
224	»	»	»	10	40	4.0	275	»	10	»	01	32	3.8
225	»	»	»	11	27	3.8	276	»	»	»	03	54	4.0
226	»	»	»	11	59	3.9	277	»	»	»	12	41	3.6
227	»	»	»	12	00	4.0	278	»	»	»	13	14	3.9
228	»	»	»	14	02	4.5	279	»	12	»	01	21	3.8
229	»	24	»	02	22	5.2	280	»	»	»	03	06	4.4
230	»	»	»	08	26	4.5	281	»	»	»	08	35	4.3
231	»	»	»	12	34	4.3	282	»	13	»	06	09	4.3
232	»	25	»	00	30	4.1	283	»	»	»	15	39	4.2
233	»	»	»	05	20	3.8	284	»	14	»	02	36	3.6
234	»	»	»	06	44	4.7	285	»	»	»	03	21	3.9
235	»	»	»	09	58	4.3	286	»	»	»	11	24	4.0
236	»	»	»	12	04	3.7	287	»	»	»	14	57	5.9
237	»	»	»	17	03	3.9	288	»	»	»	16	15	5.0
238	»	»	»	18	55	4.0	289	»	»	»	17	02	4.3
239	»	»	»	19	15	4.0	290	»	»	»	17	18	4.6
240	»	26	»	11	41	3.6	291	»	»	»	19	12	4.1
241	»	27	»	19	35	5.4	292	»	15	»	09	20	3.7
242	»	28	»	04	14	4.5	293	»	»	»	09	24	4.5
243	»	»	»	12	03	3.6	294	»	»	»	11	35	5.0
244	»	»	»	12	36	3.7	295	»	»	»	11	39	5.6
245	»	»	»	20	40	5.2	296	»	»	»	13	03	3.8
246	»	»	»	23	43	4.5	297	»	»	»	13	10	3.8
247	»	29	»	03	48	4.0	298	»	»	»	15	41	4.4
248	»	»	»	10	00	4.0	299	»	16	»	12	05	5.3
249	»	30	»	07	20	4.0	300	»	»	»	12	08	4.9
250	»	»	»	10	23	3.8	301	»	17	»	18	30	4.5
251	Sept.	1	»	11	27	3.9	302	»	18	»	05	49	4.0
252	»	»	»	20	11	5.3	303	»	20	»	22	11	4.5
253	»	2	»	19	11	4.3	304	»	21	«	04	40	4.2
254	»	»	»	19	19	4.2	305	»	»	»	15	39	3.9
255	»	»	»	21	23	4.6	306	»	»	»	18	54	4.0

Table III – (continued)

Nº	DATE			arr. time h m		M	Nº	DATE			arr. time h m		M
307	Sept.	22	1953	02	15	4.0	358	Oct.	21	1953	11	32	5.6
308	»	»	»	19	07	3.6	359	»	»	»	12	26	4.5
309	»	»	»	20	46	3.8	360	»	»	»	12	46	5.0
310	»	23	»	00	08	3.9	361	»	»	»	16	31	4.8
311	»	»	»	20	30	4.1	362	»	»	»	18	41	6.5
312	»	24	»	07	07	4.1	363	»	»	»	22	13	4.0
313	»	»	»	16	04	3.8	364	»	»	»	22	16	4.5
314	»	25	»	05	12	3.8	365	»	»	»	22	50	4.2
315	»	»	»	17	21	5.1	366	»	»	»	22	54	4.0
316	»	»	»	17	49	4.2	367	»	»	»	23	26	4.1
317	»	27	»	09	30	4.7	368	»	»	»	23	45	5.3
318	»	28	»	08	50	4.0	369	»	22	»	01	50	4.3
319	»	30	»	07	07	3.9	370	»	»	»	06	48	3.9
320	Oct.	1	»	05	54	4.4	371	»	»	»	07	03	4.8
321	»	2	»	06	33	4.3	372	»	24	»	14	22	4.1
322	»	»	»	09	58	4.0	373	»	25	»	16	55	4.4
323	»	3	»	19	18	4.0	374	»	26	»	00	11	3.8
324	»	5	»	12	18	4.4	375	»	»	»	08	21	3.6
325	»	»	»	23	14	3.8	376	»	»	»	11	56	4.0
326	»	6	»	02	41	4.2	377	»	»	»	16	06	4.6
327	»	»	»	04	01	3.6	378	»	»	»	16	41	4.8
328	»	»	»	11	15	4.0	379	»	27	»	01	05	3.7
329	»	»	»	17	05	4.8	380	»	»	»	03	18	3.6
330	»	7	»	07	18	4.0	381	»	»	»	03	30	4.1
331	»	»	»	10	54	4.0	382	»	»	»	11	51	4.0
332	»	8	»	21	25	4.4	383	»	28	»	05	12	4.0
333	»	9	»	02	31	4.1	384	»	30	»	06	54	4.2
334	»	»	»	17	32	5.0	385	»	31	»	10	01	3.9
335	»	10	»	11	19	3.9	386	Nov.	1	»	12	33	4.0
336	»	»	»	21	30	5.8	387	»	2	»	14	02	4.5
337	»	»	»	21	45	4.2	388	»	3	»	11	39	4.0
338	»	»	»	21	48	3.9	389	»	»	»	22	30	5.5
339	»	»	»	22	23	4.0	390	»	4	»	21	43	4.5
340	»	11	»	00	15	5.3	391	»	5	»	19	46	4.2
341	»	»	»	01	04	4.1	392	»	7	»	09	19	4.8
342	»	12	»	11	33	4.5	393	»	8	»	01	13	5.0
343	»	13	»	03	58	4.0	394	»	»	»	01	44	3.8
344	»	»	»	13	29	4.1	395	»	»	»	02	51	4.0
345	»	14	»	11	40	3.6	396	»	»	»	03	02	4.0
346	»	»	»	14	23	3.9	397	»	»	»	12	28	3.9
347	»	15	»	13	58	3.6	398	»	»	»	13	38	4.1
348	»	»	»	17	59	4.1	399	»	10	»	03	10	4.4
349	»	»	»	23	40	3.6	400	»	»	»	13	07	4.5
350	»	16	»	12	27	3.7	401	»	»	»	23	07	4.6
351	»	»	»	14	28	4.1	402	»	15	»	04	30	3.9
352	»	»	»	21	45	5.2	403	»	16	»	04	51	3.9
353	»	»	»	23	04	4.1	404	»	»	»	09	18	4.1
354	»	17	»	00	55	3.7	405	»	»	»	17	26	4.3
355	»	19	»	18	51	4.0	406	»	»	»	20	12	4.1
356	»	20	»	04	41	4.8	407	»	18	»	15	21	4.9
357	»	»	»	12	26	4.0	408	»	20	»	19	15	5.3

Table III – (continued)

Nº	DATE			arr. time h	m	M	Nº	DATE			arr. time h	m	M
409	Nov.	22	1953	11	41	4.7	439	Jan.	21	1954	11	42	4.9
410	»	28	»	20	18	6.0	440	»	23	»	20	16	4.6
411	»	29	»	03	31	3.9	441	»	24	»	11	10	4.0
412	»	»	»	03	37	4.2	442	»	»	»	11	37	4.2
413	»	»	»	10	46	4.1	443	»	»	»	13	34	5.4
414	»	»	»	11	37	3.8	444	»	25	»	17	51	4.1
415	Dec.	1	»	12	17	4.0	445	»	30	»	03	57	5.0
416	»	2	»	02	38	4.7	446	»	»	»	08	40	4.7
417	»	»	»	06	26	4.3	447	»	»	»	08	45	4.5
418	»	5	»	19	35	5.2	448	»	»	»	12	45	4.3
419	»	6	»	19	44	4.7	449	»	»	»	21	59	4.3
420	»	9	»	00	00	4.9	450	Febr.	9	»	13	19	4.9
421	»	»	»	09	09	4.0	451	»	16	»	04	03	4.9
422	»	»	»	11	11	4.0	452	»	23	»	04	27	4.0
423	»	16	»	14	51	3.9	453	»	»	»	19	45	4.0
424	»	20	»	21	04	4.7	454	»	24	»	01	23	4.1
425	»	21	»	04	48	4.7	455	March	3	»	03	33	3.9
426	»	»	»	10	25	4.2	456	»	»	»	19	49	5.0
427	»	»	»	12	01	4.0	457	»	6	»	15	29	3.9
428	»	26	»	23	27	4.0	458	»	7	»	03	13	4.0
429	»	28	»	02	39	6.0	459	»	8	»	08	18	5.8
430	»	»	»	04	20	4.1	460	»	»	»	08	27	4.1
431	»	»	»	04	41	4.6	461	»	»	»	10	50	4.0
432	»	29	»	19	20	4.4	462	»	»	»	16	21	4.1
433	Jan.	4	1954	14	35	4.4	463	»	»	»	20	45	4.0
434	»	6	»	20	15	4.2	464	»	9	»	13	00	4.5
435	»	7	»	12	50	4.0	465	»	10	»	17	12	3.9
436	»	18	»	14	17	5.8	466	»	14	»	17	01	4.6
437	»	19	»	14	32	4.0	467	»	15	»	06	18	4.1
438	»	»	»	19	26	4.7	468	»	»	»	06	51	4.3
						18. – Sophades 1954							
1	April	25	1954	20	04	4.7	6	April	30	1954	14	05	4.9
2	»	»	»	20	16	4.4	7	»	»	»	14	24	3.6
3	»	»	»	20	22	4.3	8	»	»	»	14	25	3.6
4	»	»	»	20	28	3.6	9	»	»	»	14	26	3.6
5	»	26	»	18	03	3.6	10	»	»	»	14	33	3.6
6	»	»	»	18	34	4.0	11	»	»	»	14	37	3.6
7	»	27	»	09	21	3.9	12	»	»	»	14	38	3.9
8	»	28	»	13	47	3.6	13	»	»	»	14	39	3.9
9	»	29	»	06	07	3.8	14	»	»	»	14	40	4.4
10	»	30	»	12	56	4.6	15	»	»	»	14	55	4.2
MS	»	»	»	13	03	7.0	16	»	»	»	14	58	4.2
1	»	»	»	13	51	3.9	17	»	»	»	15	11	4.2
2	»	»	»	13	56	4.6	18	»	»	»	15	15	3.5
3	»	»	»	14	00	3.6	19	»	»	»	15	20	3.6
4	»	»	»	14	01	3.6	20	»	»	»	15	23	3.6
5	»	»	»	14	04	4.2	21	»	»	»	15	24	3.6

Table III – (continued)

Nº	DATE			arr. time h	m	*M*	Nº	DATE			arr. time h	m	*M*
22	April	30	1954	15	28	4.3	73	April	30	1954	20	50	4.6
23	»	»	»	15	30	3.6	74	»	»	»	20	56	3.4
24	»	»	»	15	35	3.6	75	»	»	»	21	06	3.2
25	»	»	»	15	38	3.6	76	»	»	»	21	14	3.4
26	»	»	»	15	42	3.9	77	»	»	»	21	16	4.5
27	»	»	»	15	51	3.4	78	»	»	»	21	19	3.6
28	»	»	»	15	52	3.2	79	»	»	»	21	20	3.6
29	»	»	»	16	05	3.6	80	»	»	»	21	31	3.4
30	»	»	»	16	07	4.3	81	»	»	»	21	46	4.3
31	»	»	»	16	12	3.9	82	»	»	»	21	47	4.0
32	»	»	»	16	17	4.3	83	»	»	»	22	02	3.6
33	»	»	»	16	19	4.2	84	»	»	»	22	04	4.1
34	»	»	»	16	24	3.6	85	»	»	»	22	24	3.2
35	»	»	»	16	27	3.6	86	»	»	»	22	40	4.2
36	»	»	»	16	33	3.4	87	»	»	»	23	25	4.1
37	»	»	»	16	34	4.6	88	»	»	»	23	36	4.1
38	»	»	»	16	38	3.5	89	»	»	»	23	54	3.6
39	»	»	»	16	43	3.4	90	May	1	»	00	11	3.6
40	»	»	»	16	44	3.6	91	»	»	»	00	25	3.5
41	»	»	»	16	50	3.5	92	»	»	»	00	35	3.9
42	»	»	»	16	51	3.6	93	»	»	»	00	37	3.6
43	»	»	»	17	04	3.6	94	»	»	»	01	09	3.6
44	»	»	»	17	13	3.6	95	»	»	»	01	18	3.2
45	»	»	»	17	15	3.4	96	»	»	»	01	26	4.2
46	»	»	»	17	16	4.1	97	»	»	»	02	04	4.2
47	»	»	»	17	21	3.5	98	»	»	»	02	42	5.0
48	»	»	»	17	36	3.6	99	»	»	»	03	20	3.5
49	»	»	»	17	49	4.5	100	»	»	»	03	25	3.6
50	»	»	»	18	04	3.9	101	»	»	»	03	29	3.6
51	»	»	»	18	06	3.4	102	»	»	»	03	46	3.6
52	»	»	»	18	07	3.6	103	»	»	»	04	18	4.0
53	»	»	»	18	27	3.9	104	»	»	»	05	38	3.6
54	»	»	»	18	31	4.3	105	»	»	»	08	18	3.6
55	»	»	»	18	35	3.6	106	»	»	»	09	59	4.2
56	»	»	»	18	38	3.6	107	»	»	»	10	10	3.9
57	»	»	»	18	38	3.5	108	»	»	»	10	16	3.8
58	»	»	»	18	40	3.4	109	»	»	»	10	59	4.2
59	»	»	»	18	41	3.8	110	»	»	»	11	24	3.6
60	»	»	»	18	44	4.0	111	»	»	»	19	25	3.6
61	»	»	»	18	54	3.4	112	»	»	»	19	29	3.6
62	»	»	»	18	55	3.9	113	»	»	»	19	45	3.6
63	»	»	»	19	05	3.4	114	»	»	»	21	21	3.9
64	»	»	»	19	15	3.5	115	»	»	»	21	26	3.6
65	»	»	»	19	31	3.9	116	»	»	»	21	28	3.6
66	»	»	»	19	34	4.9	117	»	»	»	21	45	4.1
67	»	»	»	19	54	3.6	118	»	»	»	21	56	3.6
68	»	»	»	20	20	4.5	119	»	»	»	22	30	3.8
69	»	»	»	20	26	4.0	120	»	2	»	00	17	3.6
70	»	»	»	20	28	3.9	121	»	»	»	00	51	3.6
71	»	»	»	20	32	3.9	122	»	»	»	00	53	3.6
72	»	»	»	20	48	3.4	123	»	»	»	02	41	3.4

Table III (continued)

Nº	DATE			arr. time h	m	*M*	Nº	DATE			arr. time h	m	*M*
124	May	2	1954	06	52	4.5	175	May	7	1954	08	34	4.4
125	»	»	»	07	58	3.6	176	»	»	»	11	44	3.6
126	»	»	»	08	10	3.6	177	»	»	»	13	19	4.1
127	»	»	»	08	24	3.6	178	»	»	»	20	03	4.0
128	»	»	»	10	08	3.6	179	»	»	»	22	14	4.2
129	»	»	»	10	11	3.6	180	»	8	»	01	01	4.4
130	»	»	»	15	23	3.4	181	»	»	»	12	51	4.3
131	»	»	»	17	13	3.6	182	»	»	»	13	09	3.9
132	»	»	»	22	07	3.6	183	»	»	»	13	49	4.4
133	»	3	»	03	53	3.8	184	»	»	»	14	06	3.7
134	»	»	»	03	55	3.9	185	»	»	»	14	29	3.4
135	»	»	»	03	58	3.6	186	»	»	»	15	21	3.6
136	»	»	»	06	58	3.9	187	»	»	»	15	51	3.4
137	»	»	»	08	17	4.6	188	»	»	»	17	56	3.9
138	»	»	»	09	24	3.9	189	»	»	»	19	45	3.2
139	»	»	»	17	47	5.0	190	»	»	»	21	14	3.6
140	»	»	»	22	24	3.9	191	»	»	»	23	03	3.5
141	»	»	»	23	26	3.6	192	»	9	»	03	58	3.4
142	»	4	»	00	24	3.7	193	»	»	»	08	18	3.4
143	»	»	»	00	44	3.6	194	»	»	»	13	42	3.9
144	»	»	»	05	16	3.6	195	»	»	»	16	14	4.9
145	»	»	»	05	39	3.5	196	»	»	»	16	40	3.6
146	»	»	»	14	07	3.6	197	»	»	»	16	51	4.0
147	»	»	»	15	08	4.0	198	»	»	»	16	54	3.6
148	»	»	»	16	15	3.9	199	»	»	»	20	14	4.7
149	»	»	»	16	44	5.8	200	»	»	»	23	22	3.4
150	»	»	»	16	46	5.9	201	»	10	»	00	11	3.5
151	»	»	»	17	02	3.6	202	»	»	»	14	03	3.4
152	»	»	»	17	05	3.6	203	»	»	»	21	02	4.1
153	»	»	»	17	52	3.6	204	»	»	»	22	47	3.5
154	»	»	»	18	35	3.6	205	»	»	»	23	03	3.6
155	»	»	»	19	45	3.4	206	»	11	»	16	11	3.5
156	»	»	»	20	41	3.4	207	»	»	»	22	47	4.6
157	»	»	»	21	24	4.0	208	»	12	»	11	21	3.5
158	»	»	»	23	45	5.2	209	»	»	»	13	36	3.8
159	»	5	»	00	59	4.8	210	»	»	»	16	48	3.8
160	»	»	»	06	34	3.6	211	»	»	»	17	18	3.3
161	»	»	»	10	54	4.4	212	»	»	»	21	02	4.0
162	»	»	»	13	56	3.8	213	»	»	»	23	39	3.7
163	»	6	»	09	25	3.4	214	»	13	»	00	18	3.6
164	»	»	»	09	37	3.5	215	»	»	»	01	50	3.6
165	»	»	»	10	53	3.6	216	»	»	»	03	12	3.2
166	»	»	»	11	42	3.6	217	»	14	»	04	49	3.2
167	»	»	»	11	49	4.0	218	»	»	»	09	14	4.4
168	»	»	»	18	50	3.6	219	»	»	»	11	42	3.4
169	»	»	»	19	08	3.6	220	»	15	»	12	03	3.6
170	»	»	»	21	49	3.4	221	»	»	»	13	54	3.5
171	»	7	»	03	55	4.0	222	»	16	»	15	59	4.4
172	»	»	»	03	57	3.9	223	»	17	»	03	01	3.2
173	»	»	»	03	59	4.5	224	»	»	»	05	37	3.6
174	»	»	»	07	09	3.6	225	»	»	»	11	18	4.7

Table III – (continued)

Nº	DATE			arr. time h	m	*M*	Nº	DATE			arr. time h	m	*M*
226	May	20	1954	09	04	3.6	263	June	6	1954	03	35	3.9
227	»	»	»	12	42	3.5	264	»	»	»	16	08	3.4
228	»	»	»	12	53	3.5	265	»	7	»	00	20	3.6
229	»	»	»	15	01	4.1	266	»	»	»	11	47	3.4
230	»	»	»	17	29	3.6	267	»	11	»	13	15	4.0
231	»	24	»	14	12	4.1	268	»	»	»	17	22	3.2
232	»	»	»	14	26	3.2	269	»	12	»	09	50	3.9
233	»	25	»	21	06	4.4	270	»	»	»	15	43	4.4
234	»	»	»	22	04	5.8	271	»	»	»	16	52	3.6
235	»	»	»	22	19	3.6	272	»	14	»	12	18	4.2
236	»	»	»	22	20	3.7	273	»	15	»	00	16	3.7
237	»	»	»	23	14	4.0	274	»	16	»	22	09	4.9
238	»	26	»	00	05	3.6	275	»	19	»	12	05	3.9
239	»	»	»	00	15	3.6	276	»	»	»	14	03	3.6
240	»	»	»	00	32	3.4	277	»	22	»	06	21	3.6
241	»	»	»	00	40	3.6	278	»	24	»	13	02	3.9
242	»	»	»	00	45	3.9	279	»	25	»	04	29	3.6
243	»	»	»	01	27	3.9	280	»	»	»	06	30	4.2
244	»	»	»	08	14	4.0	281	»	»	»	12	12	4.2
245	»	»	»	08	52	3.6	282	»	»	»	15	26	4.2
246	»	»	»	09	44	3.4	283	»	26	»	12	10	3.9
247	»	»	»	10	21	3.6	284	»	27	»	03	30	3.2
248	»	27	»	17	20	3.9	285	»	»	»	08	34	3.4
249	»	»	»	17	42	3.9	286	»	»	»	12	29	3.6
250	»	28	»	01	58	4.5	287	»	»	»	12	42	3.4
251	»	»	»	07	44	5.0	288	»	»	»	13	55	3.6
252	»	»	»	07	50	3.7	289	»	»	»	23	32	3.4
253	»	»	»	17	27	3.9	290	»	28	»	03	48	3.9
254	»	»	»	22	44	3.4	291	»	»	»	22	31	3.6
255	»	29	»	02	10	3.2	292	July	1	»	04	49	3.6
256	»	»	»	16	52	3.2	293	»	2	»	23	21	4.3
257	June	1	»	23	00	3.8	294	»	3	»	13	10	4.2
258	»	3	»	08	43	3.7	295	»	4	»	05	47	4.4
259	»	»	»	22	23	4.2	296	»	6	»	13	51	3.6
260	»	4	»	01	53	4.4	297	»	»	»	16	57	4.0
261	»	»	»	15	10	3.6	298	»	9	»	23	18	4.6
262	»	5	»	14	06	5.0	299	Aug.	5	»	03	49	4.8

19. – Lemnos 1954

Nº	DATE			arr. time h	m	*M*	Nº	DATE			arr. time h	m	*M*
MS	Aug.	3	1954	18	18	6.1	11	Aug.	7	1954	00	17	4.1
1	»	»	»	18	44	4.4	12	»	»	»	01	11	4.1
2	»	»	»	23	18	4.9	13	»	»	»	13	02	4.1
3	»	4	»	01	13	4.6	14	»	»	»	14	46	4.0
4	»	5	»	04	13	5.5	15	»	»	»	14	50	4.0
5	»	»	»	04	38	5.3	16	»	8	»	10	14	4.1
6	»	»	»	04	45	4.1	17	»	»	»	10	47	3.8
7	»	»	»	04	48	4.2	18	»	»	»	17	18	4.2
8	»	»	»	07	32	4.3	19	Sept.	20	»	02	52	4.8
9	»	»	»	17	25	4.5	20	Oct.	12	»	19	29	4.1
10	»	6	»	16	02	5.2	21	Nov.	4	»	20	38	4.9

Table III – (continued)

21. – Thessalia 1955

N°	DATE			arr. time h	m	M	N°	DATE			arr. time h	m	M
1	Febr.	21	1955	19	47	5.0	20	April	23	1955	05	43	3.5
2	»	»	»	23	17	3.9	21	»	»	»	15	44	3.7
3	»	22	»	09	44	4.8	22	»	»	»	18	40	3.3
4	»	»	»	09	53	3.6	23	»	»	»	19	09	3.3
5	»	»	»	09	56	4.3	24	»	25	»	03	28	3.5
6	»	»	»	13	11	3.6	25	»	»	»	14	43	4.4
7	April	17	»	11	29	3.6	26	»	28	»	17	22	4.3
MS	»	19	»	16	48	6.3	27	»	»	»	22	18	4.4
1	»	»	»	19	07	3.6	28	»	29	»	12	37	3.3
2	»	»	»	19	08	4.0	29	May	2	1955	12	22	3.5
3	»	»	»	19	24	3.3	30	»	»	»	21	41	4.3
4	»	»	»	21	32	3.9	31	»	3	»	12	56	3.3
5	»	»	»	21	34	3.5	32	»	»	»	12	56	3.8
6	»	»	»	23	06	3.5	33	»	»	»	14	42	3.5
7	»	20	»	00	51	3.6	34	»	»	»	18	44	3.5
8	»	»	»	03	27	4.4	35	»	10	»	17	11	3.3
9	»	»	»	10	18	3.9	36	»	13	»	19	48	3.3
10	»	»	»	11	14	3.5	37	»	»	»	19	55	4.9
11	»	21	»	00	34	4.0	38	»	14	»	08	45	3.4
12	»	»	»	03	50	3.9	39	»	»	»	09	01	3.3
13	»	»	»	07	19	5.9	40	»	17	»	02	31	3.7
14	»	»	»	09	00	5.0	41	»	24	«	14	40	3.3
15	»	»	»	09	01	3.5	42	June	4	»	11	56	3.9
16	»	»	»	09	49	3.3	43	Jan.	21	1956	09	51	5.2
17	»	»	»	11	40	3.4	44	March	26	»	22	52	5.2
18	»	»	»	11	51	3.5	45	»	28	»	11	40	5.2
19	»	22	»	23	25	3.5							

22. – Samos 1955

N°	DATE			arr. time h	m	M	N°	DATE			arr. time h	m	M
1	July	15	1955	22	56	4.4	14	July	20	1955	16	07	4.4
MS	»	16	»	07	08	6.8	15	»	»	»	22	56	4.2
1	»	»	»	07	19	4.7	16	»	21	»	13	16	4.4
2	»	»	»	16	57	4.5	17	»	31	»	15	23	4.2
3	»	»	»	17	07	4.0	18	Aug.	1	»	10	01	4.2
4	»	17	»	00	52	4.2	19	»	5	»	12	58	4.3
5	»	»	»	08	24	4.7	20	»	28	»	13	40	5.2
6	»	»	»	10	30	4.0	21	Sept.	12	»	03	56	3.9
7	»	18	»	03	07	4.6	22	Nov.	10	»	08	43	4.9
8	»	»	»	04	29	4.5	23	»	»	»	09	08	4.4
9	»	»	»	07	32	4.3	24	»	»	»	13	01	4.4
10	»	»	»	11	04	4.3	25	»	»	»	22	07	4.4
11	»	»	»	16	19	4.5	26	»	11	»	18	28	4.8
12	»	20	»	15	19	4.2	27	»	»	»	20	05	4.6
13	»	»	»	16	05	4.0							

Table III – (continued)

23. – Amorgos 1956

Nº	DATE			arr. time h m		M	Nº	DATE			arr. time h m		M
1	July	8	1956	13	06	5.0	47	July	9	1956	05	14	4.1
MS	»	9	»	03	12	7.5	48	»	»	»	05	15	5.1
1	»	»	»	03	24	6.8	49	»	»	»	05	17	3.9
2	»	»	»	03	46	4.2	50	»	»	»	05	20	3.9
3	»	»	»	03	47	4.0	51	»	»	»	05	26	3.9
4	»	»	»	03	48	4.5	52	»	»	»	05	26	4.0
5	»	»	»	03	48	4.8	53	»	»	»	05	30	3.9
6	»	»	»	03	49	4.3	54	»	»	»	05	31	4.0
7	»	»	»	03	52	4.0	55	»	»	»	05	31	4.1
8	»	»	»	03	54	4.0	56	»	»	»	05	32	3.9
9	»	»	»	03	56	4.9	57	»	»	»	05	34	3.6
10	»	»	»	03	57	4.6	58	»	»	»	05	37	3.6
11	»	»	»	03	59	4.2	59	»	»	»	05	38	3.6
12	»	»	»	04	01	4.0	60	»	»	»	05	42	3.9
13	»	»	»	04	02	4.7	61	»	»	»	05	48	3.5
14	»	»	»	04	05	4.2	62	»	»	»	05	49	4.2
15	»	»	»	04	08	4.2	63	»	»	»	05	56	4.6
16	»	»	»	04	10	4.0	64	»	»	»	05	58	4.0
17	»	»	»	04	11	4.0	65	»	»	»	06	01	3.6
18	»	»	»	04	12	4.0	66	»	»	»	06	07	4.8
19	»	»	»	04	14	4.2	67	»	»	»	06	11	3.9
20	»	»	»	04	16	5.0	68	»	»	»	06	13	3.6
21	»	»	»	04	18	4.2	69	»	»	»	06	18	3.9
22	»	»	»	04	20	4.0	70	»	»	»	06	20	5.7
23	»	»	»	04	22	3.6	71	»	»	»	06	23	5.6
24	»	»	»	04	22	4.4	72	»	»	»	06	46	4.4
25	»	»	»	04	26	3.6	73	»	»	»	06	48	4.1
26	»	»	»	04	27	3.6	74	»	»	»	06	55	3.9
27	»	»	»	04	29	3.6	75	»	»	»	06	57	4.0
28	»	»	»	04	34	5.1	76	»	»	»	07	00	4.2
29	»	»	»	04	37	4.8	77	»	»	»	07	06	3.9
30	»	»	»	04	39	4.0	78	»	»	»	07	10	3.6
31	»	»	»	04	41	3.6	79	»	»	»	07	13	3.6
32	»	»	»	04	42	3.6	80	»	»	»	07	14	3.6
33	»	»	»	04	44	5.0	81	»	»	»	07	19	3.5
34	»	»	»	04	46	4.7	82	»	»	»	07	21	4.2
35	»	»	»	04	48	4.4	83	»	»	»	07	24	3.8
36	»	»	»	04	49	4.0	84	»	»	»	07	29	3.6
37	»	»	»	04	50	4.0	85	»	»	»	07	36	3.6
38	»	»	»	04	51	4.3	86	»	»	»	07	37	5.4
39	»	»	»	04	52	4.0	87	»	»	»	07	44	3.8
40	»	»	»	04	52	4.2	88	»	»	»	07	45	3.9
41	»	»	»	04	54	4.2	89	»	»	»	07	50	3.6
42	»	»	»	04	55	4.7	90	»	»	»	07	52	3.9
43	»	»	»	04	59	4.2	91	»	»	»	07	53	3.8
44	»	»	»	05	05	3.5	92	»	»	»	07	59	3.9
45	»	»	»	05	07	3.5	93	»	»	»	08	03	3.8
46	»	»	»	05	12	4.6	94	»	»	»	08	05	4.0

Table III – (continued)

Nº	DATE	arr. time h	m	M	Nº	DATE	arr. time h	m	M
95	July 9 1956	08	13	3.5	146	July 9 1956	13	55	3.5
96	» » »	08	15	4.2	147	» » »	13	57	3.9
97	» » »	08	17	4.0	148	» » »	14	08	3.9
98	» » »	08	19	3.6	149	» » »	14	32	3.6
99	» » »	08	28	3.5	150	» » »	14	35	3.5
100	» » »	08	32	3.6	151	» » »	14	39	4.0
101	» » »	08	37	4.3	152	» » »	14	48	3.5
102	» » »	08	38	4.2	153	» » »	14	49	3.6
103	» » »	08	40	3.9	154	» » »	14	50	3.5
104	» » »	08	46	3.5	155	» » »	14	52	3.6
105	» » »	08	55	3.6	156	» » »	14	54	3.9
106	» » »	09	02	3.6	157	» » »	14	58	3.5
107	» » »	09	06	3.5	158	» » »	15	03	3.9
108	» » »	09	07	4.4	159	» » »	15	59	3.8
109	» » »	09	13	3.6	160	» » »	16	09	3.5
110	» » »	09	17	3.6	161	» » »	16	10	3.6
111	» » »	09	18	4.5	162	» » »	16	24	3.9
112	» » »	09	21	3.8	163	» » »	16	25	3.9
113	» » »	09	31	4.0	164	» » »	16	29	3.5
114	» » »	09	35	3.6	165	» » »	16	44	3.5
115	» » »	09	36	4.1	166	» » »	16	52	3.5
116	» » »	09	44	3.9	167	» » »	16	56	3.9
117	» » »	09	46	5.0	168	» » »	17	08	3.9
118	» » »	10	20	4.9	169	» » »	17	28	3.5
119	» » »	10	27	3.8	170	» » »	17	41	4.1
120	» » »	10	33	3.5	171	» » »	17	51	3.5
121	» » »	10	37	4.0	172	» » »	17	54	3.9
122	» » »	10	42	4.6	173	» » »	17	58	3.8
123	» » »	10	56	3.9	174	» » »	18	06	3.9
124	» » »	11	05	3.8	175	» » »	18	13	3.8
125	» » »	11	15	3.9	176	» » »	18	15	3.9
126	» » »	11	21	4.1	177	» » »	18	24	3.5
127	» » »	11	29	3.9	178	» » »	18	33	3.6
128	» » »	11	31	5.3	179	» » »	18	35	3.8
129	» » »	11	35	4.0	180	» » »	18	36	3.9
130	» » »	11	38	3.6	181	» » »	18	38	3.5
131	» » »	11	40	4.6	182	» » »	18	39	3.8
132	» » »	11	47	4.1	183	» » »	18	58	4.0
133	» » »	12	06	4.5	184	» » »	19	02	3.6
134	» » »	12	08	3.9	185	» » »	19	05	3.6
135	» » »	12	13	3.9	186	» » »	19	11	3.8
136	» » »	12	31	3.6	187	» » »	19	14	3.6
137	» » »	12	36	3.9	188	» » »	19	24	3.5
138	» » »	12	44	3.6	189	» » »	19	33	3.5
139	» » »	12	50	3.6	190	» » »	19	36	3.6
140	» » »	12	57	4.2	191	» » »	19	37	3.5
141	» » »	12	58	4.2	192	» » »	19	48	3.5
142	» » »	13	04	3.5	193	» » »	19	57	3.5
143	» » »	13	09	3.5	194	» » »	20	06	3.5
144	» » »	13	11	4.0	195	» » »	20	11	5.1
145	» » »	13	45	3.5	196	» » »	20	14	5.6

Table III – (continued)

No	DATE	arr. time h m	M	No	DATE	arr. time h m	M
197	July 9 1956	20 24	4.5	248	July 10 1956	03 36	3.6
198	» » »	20 34	3.8	249	» » »	03 39	3.5
199	» » »	20 36	4.8	250	» » »	03 48	3.5
200	» » »	20 38	3.6	251	» » »	04 07	3.5
201	» » »	20 41	3.9	252	» » »	04 09	4.0
202	» » »	20 45	3.5	253	» » »	04 36	3.9
203	» » »	20 49	5.3	254	» » »	04 48	3.6
204	» » »	20 57	3.5	255	» » »	05 02	4.2
205	» » »	21 17	3.5	256	» » »	05 17	3.9
206	» » »	21 24	3.6	257	» » »	05 36	3.5
207	» » »	21 29	5.8	258	» » »	05 38	3.8
208	» » »	21 37	3.9	259	» » »	06 02	3.9
209	» » »	21 43	3.9	260	» » »	07 13	3.9
210	» » »	21 49	4.4	261	» » »	07 24	3.5
211	» » »	21 52	4.7	262	» » »	07 30	3.6
212	» » »	22 04	3.9	263	» » »	07 35	4.2
213	» » »	22 26	3.5	264	» » »	08 09	3.5
214	» » »	22 35	3.6	265	» » »	08 12	3.5
215	» » »	22 49	3.6	266	» » »	08 32	3.5
216	» » »	23 43	3.6	267	» » »	08 35	3.8
217	» » »	23 44	3.6	268	» » »	08 48	3.9
218	» » »	23 50	4.0	269	» » »	09 09	3.9
219	» » »	23 55	3.9	270	» » »	10 00	3.5
220	» » »	23 57	3.6	271	» » »	10 37	3.5
221	» » »	23 59	3.6	272	» » »	10 39	3.6
222	» » »	00 03	3.5	273	» » »	10 52	3.9
223	» 10 »	00 27	3.8	274	» » »	11 03	3.5
224	» » »	00 29	4.6	275	» » »	11 21	3.5
225	» » »	00 36	3.5	276	» » »	11 48	3.6
226	» » »	00 38	3.9	277	» » »	11 58	4.2
227	» » »	00 51	3.5	278	» » »	12 12	3.5
228	» » »	00 54	4.4	279	» » »	12 17	3.5
229	» » »	01 19	3.5	280	» » »	12 18	3.6
230	» » »	01 20	3.9	281	» » »	12 38	4.6
231	» » »	01 31	3.6	282	» » »	12 53	3.9
232	» » »	01 35	3.5	283	» » »	13 51	3.5
233	» » »	01 37	3.9	284	» » »	14 15	3.6
234	» » »	02 00	5.2	285	» » »	14 26	4.5
235	» » »	02 13	3.6	286	» » »	14 38	3.9
236	» » »	02 24	3.5	287	» » »	15 02	3.6
237	» » »	02 34	3.6	288	» » »	15 16	3.6
238	» » »	02 40	3.6	289	» » »	15 41	3.5
239	» » »	02 46	3.5	290	» » »	15 53	3.5
240	» » »	02 47	3.8	291	» » »	16 29	3.9
241	» » »	02 54	3.9	292	» » »	16 30	4.4
242	» » »	03 02	5.6	293	» » »	16 54	3.5
243	» » »	03 14	3.5	294	» » »	16 57	3.6
244	» » »	03 16	3.9	295	» » »	17 08	4.4
245	» » »	03 25	3.9	296	» » »	17 15	4.8
246	» » »	03 29	4.0	297	» » »	18 37	3.5
247	» » »	03 33	3.6	298	» » »	19 01	4.0

Table III – (continued)

Nº	DATE			arr. time h	m	M	Nº	DATE			arr. time h	m	M
299	July	10	1956	19	20	3.8	350	July	11	1956	23	51	4.2
300	»	»	»	19	39	3.5	351	»	12	»	01	20	3.8
301	»	»	»	20	05	3.5	352	»	»	»	06	18	4.9
302	»	»	»	20	22	3.6	353	»	»	»	08	04	3.9
303	»	»	»	21	28	3.5	354	»	»	»	08	11	4.7
304	»	»	»	21	46	3.5	355	»	»	»	08	56	3.9
305	»	»	»	22	10	4.5	356	»	»	»	09	00	3.6
306	»	»	»	22	18	4.0	357	»	»	»	09	20	3.5
307	»	»	»	22	39	3.6	358	»	»	»	10	08	3.5
308	»	»	»	22	46	4.2	359	»	»	»	11	23	3.6
309	»	»	»	23	29	3.9	360	»	»	»	16	11	4.1
310	»	»	»	23	42	4.2	361	»	»	»	21	22	4.2
311	»	»	»	23	54	3.6	362	»	»	»	23	59	4.0
312	»	11	»	00	00	3.5	363	»	13	»	00	25	3.6
313	»	»	»	00	01	3.9	364	»	»	»	02	41	4.0
314	»	»	»	00	32	3.5	365	»	»	»	03	16	3.6
315	»	»	»	01	05	4.1	366	»	»	»	04	10	3.6
316	»	»	»	01	44	3.6	367	»	»	»	08	29	4.0
317	»	»	»	01	47	3.5	368	»	»	»	10	42	4.2
318	»	»	»	02	03	4.0	369	»	»	»	11	16	3.9
319	»	»	»	02	13	3.5	370	»	»	»	11	20	4.1
320	»	»	»	02	15	3.6	371	»	»	»	14	42	4.0
321	»	»	»	02	17	3.6	372	»	»	»	16	53	4.7
322	»	»	»	02	48	4.9	373	»	»	»	19	00	3.5
323	»	»	»	03	08	3.5	374	»	»	»	21	22	3.5
324	»	»	»	03	15	3.6	375	»	»	»	21	52	3.9
325	»	»	»	03	24	3.5	376	»	14	»	01	30	3.9
326	»	»	»	04	22	3.6	377	»	»	»	03	24	3.6
327	»	»	»	04	23	4.0	378	»	»	»	05	42	4.1
328	»	»	»	04	35	3.9	379	»	»	»	06	06	4.2
329	»	»	»	04	42	3.5	380	»	»	»	17	55	3.9
330	»	»	»	04	53	3.9	381	»	»	»	23	47	4.0
331	»	»	»	05	11	3.9	382	»	15	»	10	22	4.1
332	»	»	»	05	13	3.5	383	»	16	»	02	22	3.8
333	»	»	»	05	42	3.9	384	»	»	»	05	06	3.9
334	»	»	»	06	13	3.9	385	»	»	»	05	35	4.2
335	»	»	»	06	48	3.9	386	»	»	»	05	37	3.9
336	»	»	»	08	12	4.2	387	»	»	»	06	20	3.9
337	»	»	»	09	04	3.6	388	»	»	»	17	31	3.9
338	»	»	»	09	39	3.6	389	»	»	»	21	10	3.9
339	»	»	»	10	35	4.3	390	»	»	»	21	20	3.9
340	»	»	»	10	58	3.5	391	»	»	»	21	46	4.0
341	»	»	»	11	13	3.5	392	»	»	»	22	39	3.6
342	»	»	»	12	32	3.6	393	»	17	»	08	20	3.9
343	»	»	»	12	36	3.5	394	»	18	»	02	56	3.8
344	»	»	»	13	32	3.5	395	»	»	»	06	01	4.0
345	»	»	»	14	25	3.5	396	»	»	»	07	11	3.9
346	»	»	»	15	32	3.9	397	»	22	»	03	29	5.1
347	»	»	»	15	58	3.5	398	»	»	»	12	12	3.9
348	»	»	»	21	57	4.4	399	»	»	»	20	57	4.0
349	»	»	»	22	01	3.5	400	»	26	»	22	00	3.5

Table III – (continued)

24. – NE Crete 1956

N°	DATE	arr. time h m	M	N°	DATE	arr. time h m	M
1	July 28 1956	15 20	4.6	6	July 30 1956	19 21	3.7
2	» 30 »	04 55	4.0	7	» 31 »	05 23	4.1
3	» » »	05 42	5.6	8	» » »	05 36	4.2
4	» » »	05 48	5.2	9	» » »	06 42	4.6
5	» » »	05 52	4.1	10	Aug. 9 »	03 37	4.9
6	» » »	06 18	4.0	11	» 12 »	12 53	4.0
7	» » »	06 27	4.1	12	» » »	19 42	4.5
8	» » »	08 43	4.7	13	» 16 »	07 52	3.8
MS	» » »	09 16	6.1	14	» » »	08 24	4.3
1	» » »	09 22	5.2	15	» » »	17 07	3.7
2	» » »	09 33	3.7	16	» 17 »	16 30	4.0
3	» » »	10 24	4.1	17	» » »	18 51	4.7
4	» » »	10 40	5.7	18	» 26 »	12 32	4.1
5	» » »	13 05	4.5	19	Sept. 6 »	11 46	5.7

25. – Messinia 1957

N°	DATE	arr. time h m	M	N°	DATE	arr. time h m	M
1	Febr. 19 1957	05 14	4.3	6	Febr. 21 1957	03 58	3.8
2	» » »	06 50	4.0	7	» 22 »	02 23	4.2
3	» » »	07 40	3.8	8	» 24 »	07 32	4.3
MS	» » »	07 44	6.0	9	» » »	14 35	3.9
1	» » »	08 03	4.0	10	» » »	16 40	4.1
2	» » »	09 01	4.0	11	March 1 »	07 02	3.8
3	» » »	09 16	4.5	12	» 2 »	15 30	3.8
4	» 20 »	17 37	4.5	13	» 4 »	20 49	3.9
5	» » »	17 41	3.8				

26. – Magnesia 1957

N°	DATE	arr. time h m	M	N°	DATE	arr. time h m	M
1	March 8 1957	07 59	3.4	15	March 8 1957	14 05	3.7
2	» » »	12 15	6.5	16	» » »	14 23	3.2
MS	» » »	12 21	6.8	17	» » »	14 30	3.2
1	» » »	12 48	3.4	18	» » »	14 54	3.2
2	» » »	12 52	3.2	19	» » »	15 15	3.4
3	» » »	12 55	4.9	20	» » »	15 22	3.2
4	» » »	12 59	3.4	21	» » »	15 27	3.0
5	» » »	13 01	3.4	22	» » »	15 28	3.4
6	» » »	13 04	3.2	23	» » »	15 31	3.0
7	» » »	13 06	3.4	24	» » »	15 47	3.2
8	» » »	13 19	3.0	25	» » »	15 56	3.6
9	» » »	13 21	3.4	26	» » »	16 00	3.0
10	» » »	13 24	3.5	27	» » »	16 02	3.2
11	» » »	13 27	3.9	28	» » »	16 05	3.2
12	» » »	13 34	3.0	29	» » »	16 07	3.2
13	» » »	13 39	3.0	30	» » »	16 14	3.4
14	» » »	13 40	3.2	31	» » »	16 30	3.8

Table III - (continued)

Nº	DATE			arr. time h	m	M	Nº	DATE			arr. time h	m	M
32	March	8	1957	16	35	3.2	83	March	8	1957	23	47	3.0
33	»	»	»	16	47	3.0	84	»	»	»	23	52	3.0
34	»	»	»	16	48	3.3	85	»	»	»	23	54	3.0
35	»	»	»	17	03	3.3	86	»	»	»	00	07	3.0
36	»	»	»	17	20	3.0	87	»	9	»	00	23	3.2
37	»	»	»	17	25	3.0	88	»	»	»	00	29	3.0
38	»	»	»	17	35	3.0	89	»	»	»	00	52	3.0
39	»	»	»	17	39	3.2	90	»	»	»	01	02	3.0
40	»	»	»	17	43	3.0	91	»	»	»	01	05	3.7
41	»	»	»	17	52	3.2	92	»	»	»	01	06	3.6
42	»	»	»	17	58	3.5	93	»	»	»	01	12	3.2
43	»	»	»	17	59	3.0	94	»	»	»	01	25	3.0
44	»	»	»	18	09	3.2	95	»	»	»	01	31	3.2
45	»	»	»	18	15	3.0	96	»	»	»	01	33	3.2
46	»	»	»	18	24	3.4	97	»	»	»	01	39	3.0
47	»	»	»	18	31	3.4	98	»	»	»	01	40	3.0
48	»	»	»	18	34	3.4	99	»	»	»	01	47	3.3
49	»	»	»	18	36	3.3	100	»	»	»	01	52	3.0
50	»	»	»	18	55	3.0	101	»	»	»	02	15	3.2
51	»	»	»	19	09	3.0	102	»	»	»	02	20	3.7
52	»	»	»	19	11	3.2	103	»	»	»	02	27	4.4
53	»	»	»	19	19	3.2	104	»	»	»	02	31	3.6
54	»	»	»	19	23	3.2	105	»	»	»	02	44	3.3
55	»	»	»	19	31	3.2	106	»	»	»	02	56	3.2
56	»	»	»	19	38	3.2	107	»	»	»	02	59	4.3
57	»	»	»	19	46	3.2	108	»	»	»	03	17	3.0
58	»	»	»	19	50	3.2	109	»	»	»	03	37	3.4
59	»	»	»	19	54	3.2	110	»	»	»	03	40	3.8
60	»	»	»	19	57	3.0	111	»	»	»	03	58	3.4
61	»	»	»	20	02	3.0	112	»	»	»	04	02	4.8
62	»	»	»	20	07	3.0	113	»	»	»	04	22	3.2
63	»	»	»	20	10	3.0	114	»	»	»	04	27	4.1
64	»	»	»	20	18	3.0	115	»	»	»	04	37	3.7
65	»	»	»	20	31	4.5	116	»	»	»	05	01	3.0
66	»	»	»	20	38	3.0	117	»	»	»	05	03	3.0
67	»	»	»	20	38	5.5	118	»	»	»	05	10	3.0
68	»	»	»	20	45	4.4	119	»	»	»	05	45	3.6
69	»	»	»	21	30	3.2	120	»	»	»	06	56	3.2
70	»	»	»	21	39	3.0	121	»	»	»	06	58	4.2
71	»	»	»	21	48	3.7	122	»	»	»	09	22	3.8
72	»	»	»	21	50	3.4	123	»	»	»	10	08	3.2
73	»	»	»	22	31	3.4	124	»	»	»	10	30	4.6
74	»	»	»	22	41	3.2	125	»	»	»	10	36	3.0
75	»	»	»	22	41	4.0	126	»	»	»	10	43	4.1
76	»	»	»	22	42	4.0	127	»	»	»	12	10	3.4
77	»	»	»	22	51	3.2	128	»	»	»	13	31	3.4
78	»	»	»	22	53	3.2	129	»	»	»	13	35	3.2
79	»	»	»	23	02	3.0	130	»	»	»	15	07	3.2
80	»	»	»	23	06	3.0	131	»	»	»	16	07	3.4
81	»	»	»	23	36	5.9	132	»	»	»	16	42	4.5
82	»	»	»	23	45	3.4	133	»	»	»	18	30	4.7

Table III – (continued)

Nº	DATE	arr. time h m	M	Nº	DATE	arr. time h m	M
134	March 9 1957	20 54	4.2	185	March 13 1957	18 09	3.2
135	» » »	20 59	3.8	186	» » »	20 23	3.2
136	» » »	22 07	3.2	187	» » »	22 46	3.2
137	» » »	22 42	3.3	188	» » »	23 26	3.2
138	» » »	23 08	3.4	189	» 14 »	01 04	3.2
139	» 10 »	01 33	3.2	190	» » »	03 09	3.4
140	» » »	01 59	3.2	191	» » »	03 37	3.2
141	» » »	16 25	3.4	192	» 15 »	01 09	3.9
142	» » »	16 32	3.4	193	» » »	01 56	3.4
143	» » »	17 18	3.3	194	» » »	02 03	3.4
144	» » »	23 34	4.0	195	» » »	04 12	3.9
145	» » »	01 14	3.4	196	» » »	04 50	3.4
146	» 11 »	01 16	3.8	197	» » »	09 47	3.4
147	» » »	03 08	3.4	198	» » »	11 20	3.0
148	» » »	07 20	4.9	199	» » »	11 33	3.7
149	» » »	07 25	3.4	200	» 16 »	00 46	3.0
150	» » »	07 40	3.2	201	» » »	01 26	3.0
151	» » »	07 42	3.4	202	» » »	08 25	3.0
152	» » »	09 17	3.4	203	» » »	09 18	4.0
153	» » »	09 32	5.5	204	» » »	12 48	3.4
154	» » »	13 16	3.4	205	» » »	16 53	3.3
155	» » »	13 27	4.5	206	» » »	20 01	3.2
156	» » »	13 40	5.4	207	» 17 »	01 39	3.2
157	» » »	15 46	3.2	208	» » »	02 36	3.0
158	» » »	16 19	3.4	209	» » »	09 12	3.4
159	» » »	17 49	3.2	210	» » »	10 58	3.2
160	» » »	18 42	3.4	211	» » »	13 19	3.4
161	» » »	22 37	3.2	212	» » »	14 05	3.4
162	» » »	22 52	3.4	213	» » »	20 38	3.4
163	» 12 »	01 57	3.2	214	» 18 »	01 57	3.0
164	» » »	02 46	3.7	215	» » »	03 02	3.0
165	» » »	05 04	3.2	216	» » »	20 35	3.2
166	» » »	05 11	3.4	217	» » »	21 41	3.2
167	» » »	05 49	3.2	218	» 19 »	14 04	3.2
168	» » »	12 55	3.4	219	» » »	23 50	3.2
169	» » »	15 50	3.2	220	» 20 »	04 56	3.2
170	» » »	15 51	3.2	221	» » »	14 47	3.4
171	» » »	15 56	3.4	222	» » »	22 49	3.7
172	» » »	16 39	3.8	223	» 21 »	03 31	3.2
173	» » »	17 02	3.5	224	» » »	03 50	3.4
174	» » »	17 20	3.4	225	» 23 »	15 16	3.4
175	» » »	17 36	3.2	226	» » »	21 21	3.4
176	» » »	19 30	3.2	227	» 24 »	04 11	3.2
177	» » »	22 41	3.2	228	» » »	06 25	4.9
178	» 13 »	03 44	3.4	229	» 25 »	13 03	3.2
179	» » »	04 14	3.0	230	» 26 »	23 24	4.4
180	» » »	07 46	3.2	231	» 27 »	08 12	3.4
181	» » »	09 16	3.2	232	» 28 »	09 04	3.2
182	» » »	11 21	4.0	233	» » »	19 15	3.0
183	» » »	14 42	3.4	234	» » »	22 27	5.2
184	» » »	16 29	3.2	235	» » »	23 04	3.4

Table III – (continued)

Nº	DATE			arr. time h	m	M	Nº	DATE			arr. time h	m	M
236	March	29	1957	20	03	3.2	276	May	22	1957	02	44	3.2
237	»	30	»	11	09	3.0	277	»	»	»	04	02	3.2
238	»	31	»	13	15	3.0	278	»	23	»	03	53	3.8
239	»	»	»	15	59	3.0	279	»	24	»	09	04	3.4
240	April	1	»	04	45	3.0	280	»	»	»	17	45	3.4
241	»	»	»	12	20	3.5	281	»	26	»	15	50	3.3
242	»	»	»	14	02	4.5	282	»	29	»	04	38	3.8
243	»	2	»	12	59	3.2	283	»	»	»	21	34	3.8
244	»	4	»	01	08	3.4	284	»	30	»	04	32	3.4
245	»	10	»	20	55	3.4	285	June	2	»	23	20	3.4
246	»	14	»	08	10	3.2	286	»	5	»	19	32	3.2
247	»	»	»	15	14	3.3	287	»	6	»	10	34	3.7
248	»	15	»	14	49	3.4	288	»	10	»	19	37	3.3
249	»	16	»	02	39	3.8	289	»	13	»	04	40	3.2
250	»	22	»	00	17	3.2	290	»	15	»	16	39	3.4
251	May	1	«	22	17	3.2	291	»	»	»	21	12	3.7
252	»	3	»	16	59	3.5	292	»	18	»	20	47	3.4
253	»	6	»	17	16	3.4	293	»	23	»	07	51	3.2
254	»	11	»	00	39	3.8	294	»	24	»	04	31	4.8
255	»	12	»	07	53	4.9	295	»	25	»	19	06	3.4
256	»	13	»	01	33	3.2	296	»	27	»	07	11	4.5
257	»	»	»	06	35	4.6	297	July	3	»	07	42	3.2
258	»	»	»	09	28	3.4	298	»	13	»	03	32	4.5
259	»	19	»	00	15	3.4	299	»	14	»	21	21	3.9
260	»	»	»	12	00	3.4	300	»	19	»	09	57	3.7
261	»	»	»	15	55	3.4	301	Sept.	17	»	21	11	4.5
262	»	»	»	17	48	3.2	302	»	20	»	02	20	4.7
263	»	21	»	01	24	3.4	303	»	»	»	03	14	3.2
264	»	»	»	06	16	3.4	304	»	»	»	14	51	3.2
265	»	»	»	13	25	5.8	305	»	21	»	16	51	4.3
266	»	»	»	15	06	3.2	306	Oct.	2	»	21	35	3.4
267	»	»	»	15	43	3.5	307	»	24	»	22	46	4.2
268	»	»	»	17	35	3.4	308	»	25	»	00	24	3.4
269	»	»	»	18	29	3.5	309	»	»	»	02	19	5.2
270	»	»	»	18	53	3.4	310	»	28	»	02	39	3.2
271	»	»	»	19	11	3.4	311	»	30	»	03	32	3.4
272	»	»	»	19	48	3.4	312	Nov.	14	»	23	09	3.7
273	»	»	»	21	18	3.4	313	»	26	»	08	16	5.2
274	»	»	»	21	22	3.2	314	»	»	»	11	51	5.0
275	»	22	»	00	17	3.3	315	»	27	»	03	09	5.6

27. – Lycia 1957

Nº	DATE			arr. time h	m	M	Nº	DATE			arr. time h	m	M
1	April	20	1957	15	02	4.6	4	May	13	1957	04	35	5.0
2	»	24	»	19	11	7.0	5	»	28	»	02	52	4.4
MS	»	25	»	02	26	7.3	6	July	14	»	04	32	4.5
1	»	»	»	07	53	5.3	7	Aug.	14	»	02	46	5.1
2	»	26	»	06	34	6.3	8	»	»	»	05	15	4.3
3	»	»	»	16	10	5.0	9	»	18	»	03	23	4.4

Table III – (continued)

28. – NE Turkey 1957

No	DATE			arr. time h m	M	No	DATE			arr. time h m	M
MS	May	26	1957	06 36	7.0	8	May	28	1957	05 36	4.8
1	»	»	»	08 56	5.5	9	»	29	»	08 50	4.3
2	»	»	»	09 17	4.3	10	»	»	»	10 19	4.5
3	»	»	»	09 38	6.0	11	»	30	»	13 11	4.3
4	»	27	»	06 22	4.3	12	»	»	»	14 32	4.5
5	»	»	»	07 07	4.5	13	June	1	»	05 28	4.5
6	»	»	»	11 03	5.5	14	»	»	»	21 11	4.5
7	»	28	»	00 11	4.8	15	»	2	»	01 15	4.3

29. – Zante 1958

No	DATE			arr. time h m	M	No	DATE			arr. time h m	M
MS	Aug.	27	1958	15 17	6.5	27	Sept.	2	1958	02 52	4.6
1	»	»	»	16 03	4.4	28	»	»	»	03 48	4.0
2	»	»	»	16 46	3.6	29	»	7	»	08 35	3.9
3	»	»	»	17 08	4.2	30	»	8	»	17 31	4.1
4	»	»	»	17 28	3.6	31	»	9	»	12 52	3.9
5	»	»	»	22 29	3.6	31*b*	»	12	»	21 23	4 1
6	»	»	»	22 33	3.4	32	»	14	»	04 27	3.9
7	»	28	»	03 42	3.7	33	»	»	»	05 27	3.4
8	»	29	»	12 16	3.6	34	»	»	»	15 16	3.4
9	»	30	»	05 00	3.4	35	»	15	»	15 06	3.4
10	»	»	»	07 36	5.0	36	»	16	»	02 50	3.7
11	»	»	»	09 24	3.6	37	»	»	»	04 12	4.2
12	»	31	»	04 53	3.7	38	»	»	»	08 57	4.7
13	»	»	»	12 46	3.6	39	»	»	»	20 05	3.4
14	»	»	»	15 58	3.7	40	»	18	»	08 48	3.7
15	Sept.	2	»	00 18	3.4	41	»	19	»	14 12	3.4
16	»	»	»	01 14	5.6	42	»	21	»	07 47	3.4
17	»	»	»	01 30	3.9	43	»	»	»	10 17	3.4
18	»	»	»	02 07	4.3	44	»	23	»	08 29	3.4
19	»	»	»	03 47	3.7	45	Oct.	5	»	18 37	3.7
20	»	»	»	03 54	3.6	46	»	10	»	00 59	4.4
21	»	»	»	04 41	3.7	47	»	20	»	10 06	3.9
22	»	»	»	04 46	4.4	48	»	»	»	12 50	3.4
23	»	»	»	07 30	3.6	49	Nov.	10	»	10 52	3.7
24	»	»	»	10 11	3.7	50	»	15	»	06 46	3.7
25	»	»	»	15 53	3.9	51	»	16	»	10 37	3.9
26	»	»	»	01 49	3.4	52	Dec.	20	»	18 06	4.0

31. – NW Crete 1959

No	DATE			arr. time h m	M	No	DATE			arr. time h m	M
1	May	14	1959	06 28	5.1	3	May	14	1959	11 27	4.3
MS	»	»	»	06 38	6.4	4	»	16	»	08 19	4.5
1	»	»	»	08 49	3.8	5	June	5	»	20 11	4.2
2	»	»	»	08 50	3.8	6	»	10	»	04 17	5.8

Table III – (continued)

32. – Albanian 1959

N°	DATE			arr. time h	m	M	N°	DATE			arr. time h	m	M
1	Aug.	17	1959	01	34	6.0	2	Sept.	4	1959	11	00	4.3
2	»	»	»	04	30	5.2	3	Oct.	5	»	20	35	5.5
3	»	18	»	22	05	5.1	4	»	7	»	08	32	5.9
MS	Sept.	1	»	11	39	6.4	5	»	8	»	07	22	4.2
1	»	3	»	04	03	5.0	6	»	10	»	16	12	4.1

33. – Zante 1959

N°	DATE			arr. time h	m	M	N°	DATE			arr. time h	m	M
MS	Nov.	15	1959	17	09	7.0	10	Nov.	27	1959	00	27	5.5
1	»	»	»	17	32	5.0	11	»	»	»	02	44	3.8
2	»	»	»	20	58	4.4	12	»	»	»	06	29	4.1
3	»	»	»	21	57	4.0	13	Dec.	1	»	12	37	4.0
4	»	16	»	05	58	4.1	14	»	»	»	12	40	6.1
5	»	»	»	07	30	3.6	15	»	»	»	12	53	4.9
6	»	»	»	09	21	3.8	16	»	17	»	20	11	4.0
7	»	17	»	05	50	3.8	17	»	24	»	17	14	4.1
8	»	»	»	06	07	3.9	18	»	28	»	15	52	4.0
9	»	27	»	00	23	5.7							

34. – Albanian 1960

N°	DATE			arr. time h	m	M	N°	DATE			arr. time h	m	M
1	May	26	1960	00	49	4.5	2	May	26	1960	07	05	4.0
2	»	»	»	00	56	4.3	3	»	»	»	11	41	4.0
3	»	»	»	01	56	4.1	4	»	»	»	18	23	4.1
MS	»	»	»	05	11	6.5	5	»	»	»	18	33	4.1
1	»	»	»	05	39	4.6	6	June	9	»	08	25	5.2

38. – Zante 1962

N°	DATE			arr. time h	m	M	N°	DATE			arr. time h	m	M
MS	April	10	1962	21	38	6.3	16	April	11	1962	00	07	3.6
1	»	»	»	21	50	3.8	17	»	»	»	00	11	4.0
2	»	»	»	21	57	3.8	18	»	»	»	00	20	3.6
3	»	»	»	21	58	4.0	19	»	»	»	00	23	4.1
4	»	»	»	22	01	3.8	20	»	»	»	00	25	4.0
5	»	»	»	22	12	4.9	21	»	»	»	00	29	4.0
6	»	»	»	22	23	3.6	22	»	»	»	00	49	3.6
7	»	»	»	22	33	3.8	23	»	»	»	00	55	3.6
8	»	»	»	22	58	3.6	24	»	»	»	01	12	4.0
9	»	»	»	22	59	4.0	25	»	»	»	01	22	3.6
10	»	»	»	23	20	3.6	26	»	»	»	01	26	3.6
11	»	»	»	23	37	4.1	27	»	»	»	01	29	4.0
12	»	»	»	23	42	3.8	28	»	»	»	01	31	4.0
13	»	»	»	23	44	4.2	29	»	»	»	01	37	4.5
14	»	11	»	00	01	3.6	30	»	»	»	01	41	3.6
15	»	»	»	00	03	3.6	31	»	»	»	01	48	4.0

Table III – (continued)

Nº	DATE			arr. time h	m	M	Nº	DATE			arr. time h	m	M
32	April	11	1962	01	59	4.1	83	April	13	1962	22	09	3.9
33	»	»	»	02	12	3.6	84	»	14	»	08	59	3.8
34	»	»	»	02	27	3.6	85	»	»	»	16	58	3.6
35	»	»	»	02	30	3.6	86	»	»	»	17	57	3.6
36	»	»	»	02	31	3.6	87	»	»	»	21	03	3.8
37	»	»	»	02	39	3.6	88	»	15	»	03	30	3.6
38	»	»	»	02	50	3.6	89	»	»	»	04	09	3.6
39	»	»	»	02	55	3.9	90	»	»	»	09	44	4.0
40	»	»	»	02	56	4.0	91	»	»	»	11	53	3.6
41	»	»	»	03	07	3.6	92	»	»	»	22	11	3.6
42	»	»	»	03	12	4.0	93	»	16	»	00	06	3.9
43	»	»	»	03	19	3.6	94	»	»	»	00	16	5.2
44	»	»	»	03	44	4.0	95	»	»	»	01	36	3.6
45	»	»	»	03	49	3.6	96	»	»	»	01	47	3.6
46	»	»	»	03	56	3.6	97	»	»	»	03	28	3.6
47	»	»	»	04	06	3.8	98	»	»	»	13	12	4.0
48	»	»	»	04	07	3.6	99	»	17	»	11	16	4.1
49	»	»	»	04	22	3.6	100	»	»	»	11	35	5.3
50	»	»	»	04	26	3.6	101	»	»	»	13	25	3.8
51	»	»	»	04	48	3.6	102	»	»	»	14	55	4.1
52	»	»	»	04	54	3.6	103	»	»	»	15	46	3.6
53	»	»	»	04	58	3.6	104	»	18	»	08	12	3.9
54	»	»	»	05	34	3.6	105	»	»	»	09	16	4.1
55	»	»	»	08	15	3.6	106	»	»	»	10	45	4.6
56	»	»	»	09	43	4.0	107	»	»	»	17	33	3.8
57	»	»	»	10	48	5.3	108	»	19	»	00	57	3.6
58	»	»	»	10	59	3.6	109	»	»	»	02	07	4.5
59	»	»	»	13	12	4.1	110	»	»	»	03	18	4.7
60	»	»	»	13	19	3.6	111	»	20	»	14	43	3.6
61	»	»	»	16	24	4.0	112	»	24	»	07	47	3.6
62	»	»	»	18	55	3.9	113	»	25	»	06	23	4.8
63	»	»	»	20	33	3.6	114	»	»	»	09	50	4.0
64	»	»	»	22	46	3.6	115	»	27	»	00	59	3.6
65	»	»	»	23	15	3.6	116	»	28	»	05	46	3.6
66	»	12	»	00	03	4.1	117	»	»	»	20	57	4.0
67	»	»	»	00	44	4.2	118	»	29	»	07	57	4.0
68	»	»	»	01	28	3.6	119	»	»	»	08	09	3.6
69	»	»	»	01	31	3.6	120	»	»	»	09	26	4.0
70	»	»	»	01	38	3.6	121	»	»	»	09	44	3.6
71	»	»	»	03	30	3.9	122	»	»	»	11	08	3.6
72	»	»	»	05	15	3.8	123	»	»	»	11	11	4.0
73	»	»	»	08	57	4.2	124	»	»	»	14	04	3.6
74	»	»	»	11	33	4.0	125	»	»	»	18	02	4.4
75	»	»	»	15	25	4.0	126	»	»	»	20	03	3.6
76	»	»	»	16	19	3.6	127	»	»	»	21	31	3.6
77	»	»	»	19	04	3.9	128	»	30	»	11	51	4.0
78	»	»	»	20	12	3.6	129	»	»	»	12	00	3.6
79	»	»	»	22	58	3.6	130	May	1	»	11	55	4.2
80	»	»	»	23	52	3.8	131	»	4	»	00	29	3.6
81	»	13	»	04	16	3.6	132	»	5	»	21	37	3.6
82	»	»	»	10	50	4.0	133	»	»	»	22	29	4.0

Table III – (continued)

N°	DATE			arr. time h m	M	N°	DATE			arr. time h m	M
134	May	6	1962	04 02	4.0	137	May	6	1962	22 28	4.0
135	»	»	»	06 43	4.3	138	»	»	»	23 37	4.0
136	»	»	»	21 41	4.3	139	»	29	»	23 45	4.5
				40. – KEPHALLENIA 1962							
MS	July	6	1962	09 17	6.3	19	July	6	1962	16 42	4.1
1	»	»	»	09 29	4.3	20	»	»	»	16 46	4.0
2	»	»	»	09 37	4.7	21	»	»	»	16 56	4.0
3	»	»	»	10 58	4.0	22	»	»	»	17 00	4.3
4	»	»	»	10 59	4.2	23	»	»	»	18 58	3.8
5	»	»	»	11 10	4.2	24	»	»	»	19 04	3.8
6	»	»	»	11 34	4.2	25	»	»	»	20 22	4.0
7	»	»	»	11 37	4.1	26	»	7	»	04 18	3.8
8	»	»	»	12 36	3.8	27	»	»	»	08 08	4.1
9	»	»	»	12 37	3.8	28	»	»	»	08 31	3.8
10	»	»	»	12 43	3.8	29	»	»	»	09 09	3.8
11	»	»	»	13 26	4.3	30	»	»	»	12 21	4.3
12	»	»	»	13 46	4.2	31	»	»	»	12 47	4.7
13	»	»	»	14 20	4.5	32	»	»	»	13 11	3.8
14	»	»	»	14 (21)	4.2	33	»	»	»	15 46	4.0
15	»	»	»	15 52	4.2	34	»	»	»	23 10	4.2
16	»	»	»	15 55	4.2	35	»	8	»	02 13	3.8
17	»	»	»	16 06	4.2	36	»	28	»	12 17	4.5
18	»	»	»	16 11	4.2						

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