

Catalogue of ancient earthquakes in the Mediterranean area up to the 10th century

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with the collaboration of

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translated from Italian by Brian Phillips

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Foreword

This Catalogue is a translation of a revised form of the Italian catalogue published in I terremoti prima del Mille in Italia e nell'area mediterranea (December 1989, pp.574-756). Four years have passed since that first publication, and the Istituto Nazionale di Geofisica has thought it appropriate to make the data available in a new augmented and revised version, with an updated bibliography. Furthermore, it has been possible to include the historical sources in all their original languages, thereby achieving something which is linguistically and historiographically different from traditional earthquake catalogues. From the point of view of both historical and seismic research, it is no small matter, in our view, to have made a critical collection of data relating to almost two thousand years of seismic history. The sequence of catalogue entries provides a fascinating overview of the Mediterranean basin in the long period and through its many different cultures and languages, thereby appealing to a variety of readers with perhaps differing interests.

In recent years, there has been an increasing interest in data of this kind, and we like to think that we have made a contribution to that interest, through the dedicated research carried out by our Institute and its collaborators. In studying first the situation in Italy and then that in the ancient world as a whole, it has become clear that there is an interesting convergence of elements which go beyond the strictly scientific aims of an earthquake catalogue, because they involve the responses of Mediterranean built environments to the problem of earthquakes and seismic disasters. As is inevitably the case when one tackles such a problem, no single discipline is capable of providing all the answers, and the answers themselves often become questions in other research fields. This Catalogue identifies a number of aspects of the problem, sets out data, locations and chronology and, above all, tries to place the information provided in its original historical context, using specialised skills and a homogeneous methodological approach. It is our hope, therefore, that this contribution to the understanding of the seismicity of the Mediterranean area will stimulate further research in the countries concerned, perhaps along different lines and in different disciplines.

Enzo Boschi

President of the Istituto Nazionale di Geofisica

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in memory of
Vít Kárník 1926-1994

Vít Kárník was the chief scientific advisor for the Mediterranean Seismic Risk Reduction program, to which he contributed many fresh ideas, notably on the economic implications of risk assessment.

He was deeply involved in some of the United Nations' most significant pioneering activities in disaster reduction, and contributed significantly to the integrated risk management concept.

The historical contexts of earthquakes: an introduction

Research aims and stages

As late as the mid-17th century, educated people still accepted as established fact that the earth was created in accordance with biblical chronology, thus believing that it was no more than six thousand years old. This calculation meant that their view of the earth's age was related to their time scale for the life of man: they saw the creation as coinciding with the beginning of time and of human life. Hence it was possible to recount the life of man on earth from Adam onwards as an uninterrupted sequence of events, for it was certain that man had existed from the beginning, and Chaos alone had existed before him. We now know that the earth has existed for more than four thousand five hundred million years; and hence the division of geological history into periods marking out successive changes in our planet, as well as the dynamics responsible for earthquakes, belong to a time scale of the order of millions of years.

The history of man and of the changing course of civilisations is thus no more than the latest link in a temporal chain of immense length. Yet, when we examine human history from that little observatory whose operations are governed by the biological time of birth and death, life of Earth seems almost stationary. The geological dynamics responsible for earthquakes can therefore be assumed to be relatively unchanging within historical time; for there are undoubtedly striking similarities between the seismic activity of the past and of our own time — and presumably of the near future. This does not mean that seismic activity has regular features which can be pre-established in a deterministic way, but rather that a study of historical seismicity can provide important evidence about the spatial and temporal distribution of earthquakes.

a key to understanding
current seismicity

The *long present* of these dynamics is a premise which underlies not only our particular piece of research (and indeed the study of historical seismicity as a whole), but also more general considerations about the relationship between seismic activity and its effects on the human environment.

Only over a long period, indeed, is it possible to establish with certainty the seismic activity of a particular area and identify, at least in general terms, the earthquakes produced by given geological structures, thus allowing the formulation of theories about the future behaviour of such activity. Such an approach is of statistical type, and is for the time being that most frequently used, because it makes precautionary measures possible, and because of the valuable evidence it provides concerning the seismic potential of a given area.

The more light we can shed on the seismic characteristics of a geographical area, the more help we have in identifying the periods of recurrence of major seismic events, establishing exact locations for traces of known seismic activity, or discovering new traces of such activity.

The present research was planned and carried out between 1987 and 1993 in two stages. The first (1987-88) had two aims:

stages in our research

1) to draw up a catalogue of earthquakes in Italy and the Mediterranean from

remote antiquity to the 10th century A.D., the latter being the starting point of the 1985 *Catalogo dei terremoti italiani* (Postpischl 1985),

2) to throw light on the historical significance of this seismicity, that is to say on how the seismogenic nature of an environment — which is one of its physical characteristics — has affected the habitational and cultural systems of civilisations which are different from our own.

The results of this stage of the research have been published in Italian (Guidoboni 1989).

The second stage of the research was carried out in 1991-93 and involved:

- 1) a complete revision of the data already collected and its more critical arrangement, especially for the earliest earthquakes;
- 2) the inclusion of new sources (Latin and Greek) and bibliographical updating;
- 3) the addition of documentation from Hebrew, Syriac, Ethiopic, and Arabic sources;
- 4) the extension of the area covered by the catalogue to include Armenia, with the relevant sources.

There has been an ever-increasing need for a catalogue with new perspectives; for traditional catalogues of ancient earthquakes of the Mediterranean have relied on a now unsatisfactory scholarly tradition which took firm hold in the 19th century and has persisted into our own time. Such catalogues are interesting evidence of a literary culture and a type of scientific erudition which is inevitably giving way to more specialised approaches. The principal limitation of these catalogues, in all their different forms, lies in the fact that they offer a rather confused picture, in spite of the seeming accuracy of the numerical data provided.

Present-day catalogues — including those which are most alert to historical evidence — are like grids into which data are inserted in order to provide evidence which is in fact difficult to use in a “positive” way. Such a system of cataloguing is in fact only compatible with the cognitive systems of its own day, and is dependent on the parameters of the data used. The problems involved in each historical earthquake catalogue are indeed never simple and in nearly every case are only capable of conventional and approximate solutions. In relation to the chronological period with which we are concerned, moreover, the sources are usually heterogeneous, belonging to very distant and diverse cultural backgrounds. The evidence for historical earthquakes, in fact, is not confined to historiographical texts such as annals and chronicles, but may also be found in inscriptions and religious works, or even in passing remarks by poets or men of letters. If these disparate sources are taken at face value and turned into chronological lists of data and assessments, misunderstandings and simplistic conclusions will inevitably result. It has therefore been necessary for us to consider carefully the meaning and limitations of our cataloguing type, for even when it is used with great care and respect for the original texts, a certain amount of arbitrariness is always involved. Since the data on ancient earthquakes up to the 10th century come from a strictly limited number of documentary sources, there is a risk that, if they are isolated from their underlying problems and divorced from their original purpose, they will be reduced to no more than “simplistic” data, of a kind more akin to anecdote and curiosity than to historical and scientific comment.

fragmentary data

The number of extant sources from antiquity and the early Latin Middle Ages in the Mediterranean areas, up to and including the 10th century, is considerable but limited in scope. It is clear that all historical texts have undergone a complex selective process of both a deliberate and involuntary kind. And in the case of earthquakes, we can identify at least three “filters” which have interfered with the “filters” used by the sources ways in which evidence has come down to us.

The first of these is of a general nature. It goes back to the time when direct evidence was originally available, and is therefore affected by the mental attitudes of that time — that is to say, by the “objective” limits imposed by the particular perception of natural phenomena. The selection of data was thus influenced by those kinds of knowledge and opinion which constituted the general cognitive attitude of a given age to observed phenomena. Not all earthquakes, for example, were perceived as such, and in any case it was not thought necessary to take all seismic phenomena into account. But that does not mean that in antiquity only major earthquakes were recorded. On the contrary, many sources report minor phenomena (perhaps accompanied by “prodigious” events such as noises or sudden collapses), drawing particular attention to them because of their significance in a religious or political context.

The second filter affects contemporaneous as well as later testimony, and is more closely related to the mentality and culture of the individual writer, who might “select” certain aspects of a seismic phenomenon for inclusion in a narrative on subjective or contingent grounds.

The third filter is completely “involuntary”, but no less important from a historical point of view. It is brought into operation by the multitude of circumstances surrounding destruction, the dispersal of communities or cases of chance survival. From this point of view, real seismicity and tales of seismicity are like the two prongs of a pair of forceps, which move farther apart the deeper one probes into the past; and that involves a higher probability of chance omissions and gaps. The disappearance of a large proportion of the original literary texts is a particularly serious matter in the case of classical antiquity. It means, in fact, that the amount of information available has been reduced, even in the case of those texts which were in one way or another comparatively privileged, in that — unlike those belonging to other ancient cultures — they were part of such highly developed literary cultures as those of Greece and Rome. many lost texts

However comprehensive our research, and however well-supported it may be by a corpus of secondary sources and other evidence capable of fleshing out factual information by shedding light on its context, the available information is still far from providing us with that objective image of seismic activity which we assume from present-day models to be potentially available. The islands of memory which emerge from the distant past are not only random, but also lacking in the meaning and resonance which they must have had for those who wrote the texts and those who originally read them. In general terms, therefore, we can say that we are dealing with sources which are few in number, difficult to assess, and not always consistent with one another. Strictly speaking, therefore, they ought not to be used in an earthquake catalogue designed to provide a list of historical events valid for traditional statistical purposes.

Towards a new kind of historical seismology

We have already pointed out that the macroprocesses which generate earthquakes can be assumed to be relatively stable within the time scale of human life on earth. That is an important factor in establishing an interpretative seismic model, which can now be based on a substantial body of experimental data (the speed of movement of tectonic plates can be measured, directly or deductively, by means of instruments; rocks can be dated radiometrically, and so on). Over the long period, data on historical seismic phenomena provide invaluable empirical information to help locate seismogenic areas, understand seismic activity in these areas, and assess the interaction between area and earthquake, the aim being to quantify seismic hazard and co-ordinate different kinds of data. This latter question is relevant, for example, to the relationship between *intensity* and *magnitude*. If we use qualitative and descriptive data to define the area in which an earthquake is felt, we can derive from it at least an approximate value for its *magnitude*, as a unit of measurement linked to the seismic energy involved.

Until a few years ago, instrumental seismology and historical seismology were considered to be almost antithetical in their respective objectivity and subjectivity, but certain epistemological affinities between them have now been shown to exist.

human beings
as extraordinary
"seismographs"

The problems involved in using data based on observation are in fact not so very different from the more general problems involved in the use of measuring instruments. For the validity of scientific data obtained by means of instruments is considered to depend on two basic factors: a) the validity of the laws governing the way recording equipment works; b) an understanding of the effective environmental conditions in which the equipment is used.

As far as seismographs are concerned, these conditions are usually fulfilled to a high degree. But the data used in historical seismology lie at the very end of the *continuum* of objective acceptability; for in our case, factor (a) is provided by the use of linguistic and semantic systems, cultural and religious filters, and personality "mechanisms"; factor (b) by the knowledge of contextual conditions created by social, economic, political and other situations.

Although any attempt to maximise (a) and (b) will produce very different results in relation to different periods and areas, the problems are, generally speaking, the same. We have to accept that in their role as "assessors", human beings are invaluable but imperfect, varying in kind as well as being subject to outside influences. In spite of these facts, historical seismic data have continued to be used in seismological circles in a simplistic way, without the application of a proper historical research methodology. This has meant, however, that there has been obvious diffidence as to their quality, and therefore a certain reluctance to use them for scientific purposes.

Only in the last ten years has research experience brought about a substantial improvement in the quality of such data. What is new about historical seismology as a discipline lies in its methodological premises. To say that it adopts a historiographical method is perhaps not enough, for what is characteristic of it are the questions it asks and the research methods applied in order to find an answer. From this point of view, we see how important it is to establish general historical contexts (political, cultural, religious, architectural, etc.). That is not an optional

research “luxury”, but something which serves to throw light on the “filters” through which historical data pass before becoming part of a usable written source. And what is more, an analysis of these contexts provides the parameters for understanding descriptive data.

Collaboration with historians now has to be seen as multidisciplinary collaboration, not only at the project and data collection stages, but also when it comes to interpretation.

Establishing the co-ordinates of individual seismic phenomena within the time span which concerns us, and using the types of source available, has to remain a matter of hypotheses: it has to be remembered that location is nearly always “distorted” by the prestige of large cities as opposed to smaller country towns. As we have pointed out, the compilation of this earthquake catalogue has been a complex task, involving not only the tracking down and interpretation of sources, but also bibliographical research, a critical reappraisal of traditional historical seismology, and the identification of new historiographical contributions, which have been on the increase in the last three years. Equally complex have been the questions we have asked ourselves in trying to throw light on the various seismic scenarios. In particular, we have had to improve on past documentation by offering more accurate datings and less vague locations; and at the same time take into account repercussions within the social fabric and on the cultural and natural background. This latter consideration is of no little importance because, in the final analysis, it is the way an earthquake is “received” that conditions the sources which we now have available.

Then we had to ask ourselves a question which has so far aroused little interest in scientific circles: how did the cultures of the past react to earthquakes? From a seismological point of view, it is a matter of some interest to know whether, over a long period, disastrous seismic effects were recurrent and directly related to natural seismicity, or whether there were appreciable variations, depending on changes in living conditions. In other words, we wanted to know whether, during the period covered by this catalogue, man’s relationship to earthquakes and their effects had been modified by specific historical variables.

To find the answers to these questions and to seek to establish certain specific aspects of seismic scenarios, it was necessary to have recourse to a variety of disciplines: history, seismology, geology and archaeology. The preliminary results of this multiple dialogue were published as a sort of introductory “laboratory” to the first version of the catalogue, consisting of a number of essays and studies on various aspects of the various historical contexts, and on many scientific interpretations of the evidence. These were included in the Italian edition of the catalogue (Guidoboni 1989), and have again been partly used and referred to in this new edition.

The premises underlying our work belong, in any case, to a trend which has been developing in Italy during the last ten years or so, and has established the methodological basis for a new kind of historical seismology — made possible, in Italy, by the convergence of a number of different factors which we can summarise in the following four points:

1) the need to undertake a large-scale systematic review of seismicity in Italy;

favourable research
circumstances

historical contexts

2) the striking diversity of historical, social and economic situations in different areas, even though those areas might be small and the chronological period concerned quite brief. For the fact that Italy had a large number of political units in the past meant that an unusual variety of situations arose, and these had to be taken into account in our basic historical research. This factor has, indeed, particularly attracted the attention of scholars to the historical background of individual regions struck by earthquakes, and they were often regions with widely differing source traditions as well as architectural and economic situations;

3) the fact that a wealth of historical buildings has survived, and needs to be preserved and protected;

4) the general availability for discussion of those who, in various ways and in various places, have planned research in historical seismology over the last ten years, thereby stimulating the production of more complex and informative data.

instrumental
and historical data

This kind of historical seismology pays due attention not only to textual exegesis but also to extra-textual factors, and is some way from the traditional use of historical data in the world of science from the 19th century onwards, for it was then mostly limited to the simple "transformation" of qualitative and descriptive data into figures of the kind produced by seismic instruments. This practice meant that a great deal of information was lost, as researchers have pointed out on different occasions (Proceedings 1989, 1990; Guidoboni and Stucchi 1993).

Apart from the methodological defects of these practices, which still smack of the positivism of the earliest researches in the field, it must also be pointed out that most historical earthquake catalogues — including some recent ones — were compiled by seismologists who were out of touch with historical research and its methods. In the case of the earliest periods in particular, the available information was analysed in a limited way and sometimes grossly misunderstood.

As far as historians of antiquity and the early Middle Ages are concerned, it has to be said that on the whole they have shown little interest in research of this kind. A few scholars have compiled basic lists of the principal known earthquakes (Nissen 1883; Capelle 1924; Downey 1955; Grumel 1958; Hermann 1962), but generally speaking they have not added substantially to the earlier 19th century catalogues compiled by seismologists. These lists are scientifically speaking quite uncritical and in any case lack analysis and discussion, their principal merit lying in the provision of more accurate clues for tracking down sources, by establishing more precise datings.

The fact remains, however, that these catalogues have done little to stimulate historical research. Archaeologists are the only exception to this general rule, but they too have used these lists in an uncritical way, by attempting to correlate excavated collapses with scanty literary and epigraphic evidence, in order to identify a seismic event as the cause of the disaster.

Sometimes, as various entries in this catalogue will show, an earthquake had previously been identified in a sometimes arbitrary way and without justification of the parameters of time and place. A single piece of written evidence — especially when it was the only evidence available in a situation of scanty documentary information — had proved too much of a temptation for some scholars. Thus, while the intention was to provide a better historical framework for an event which other-

wise had no history, what often took place was a forced and sometimes arbitrary superimposition of literary and archaeological data, using a system of “attraction” which is typical of historical studies for distant periods of time.

The risks involved in such a procedure will become clearer when we deal with the problems of seismic archaeology. The “historian” and the “scientist” may trust each other, and thus they may end up by accepting and confirming each other’s mistakes.

In our opinion, the most important limitation to the traditional study of historical earthquakes in the field of seismology lies in the fact that “positive” historical data have simply been inserted into a narrow space-time grid, without investigating their general contexts. We believe that the analysis of historical contexts makes it possible to reconstruct aspects of historical seismic scenarios in a more realistic way. It is thus not simply a problem of seeking out informative sources and applying more or less rigorous criteria in deciding whether to accept or reject records about seismic effects.

research limitations
if confined
only to “positive” data

The historical approach to seismicity cannot be reduced to such simplistic terms, for it involves a broader and more complex understanding not only of the conditions in which a seismic event took place but also of a human “causes”, in the widest sense of the term, which determine certain kinds of effect. The relationship between levels of economic activity and the particular building “languages” still remains to be investigated from the point of view of their influence on seismic effects — indeed, this could well be a central theme for historical seismology in the future. Such developments would seem to be particularly relevant to countries like Italy, in which the survival of a wealth of minor as well as monumental historical buildings makes it necessary to adopt modern preservation systems (Giuffrè 1993).

Quite apart from these potential developments, however, it has to be recognised that in recent years considerable advances have already been made in the study of historical earthquakes. Research undertaken in a number of countries has adopted new historiographical perspectives, with a greater awareness of and sensitivity to contexts. Historians are abandoning their previous role as minor contributors to seismology and showing signs of a convergent thematic approach in their under-scoring of new problems and data. There have thus been a number of recent seismological studies based on serious historical research (for lack of space, we simply mention some of these recent works, as Gutdeutsch *et al.* 1987; Figliuolo 1988-89; Eisinger *et al.* 1992; Riera *et al.* 1992; Evangelatou-Notara 1993; Stucchi 1993; Musson 1994; etc.). New information systems for the management of historical earthquake data are also contributing to the development of an increased sensitivity and attention to the use of basic historical data (see Boschi *et al.* 1994).

new approaches to
historical earthquake data

There is no doubt that historical seismology has its own problems and research methods. For all the above reasons, it seems sensible to attempt to define seismic effects in a way which takes account of their historical connotations. For in the light of the information we have gathered, it can be seen that there is no foundation for the tendency (deriving from a positivistic attitude) to attribute to major earthquakes — as well as to volcanic eruptions, floods or droughts — a decisive role in changes, transformations and breaks in continuity which can in fact be accounted for in quite different ways.

seismic disasters
and catastrophes: some
distinctions

Like every other deterministic theory, such a tendency has no historical justification. No culture has ever been wiped out or reduced to crisis condition by an earthquake, unless it was already in a state of decline. The same could be said not only of all kinds of natural disaster (flooding, swamping, silting etc.), but also of man-made disasters such as wars and invasions, and indeed of great epidemics as well. Such theories were very fashionable in the late 19th and early 20th century, and they reappear now and again in a more or less simplistic form.

The fact is that seismic characters of an area can be seen as a bond between the natural environment and the living and building systems of sedentary civilisations. It is a bond which, with the passage of time, has become intertwined with a multiplicity of natural and historical contingent circumstances, as well as with economic standards and lifestyles, which will themselves vary in space and time. From this point of view, we think that the term "natural catastrophe" should be used with great caution. The expression comes to us through the Greek philosophers and the Bible, and was much used in naturalistic European literature in the 17th and 18th centuries, where it had a limited sense, being used to describe those phenomena which were thought to have supernatural causes. As time passed, however, the meaning of the term was extended to include all strong earthquakes or volcanic eruptions (Tesi 1992), and it is this use we are doubtful about.

In our opinion, to define an earthquake as a "catastrophe" is to overemphasise the extreme outcome of the phenomenon concerned, because such a definition neglects the stable elements in "normal" living conditions: it is these conditions which convey what is really involved, namely the sum total of all factors affecting a potential risk. In other words, there is a tendency to forget that it is the particular characteristics of inhabited sites which make them inadequate in relation to the dynamic characteristics of the land on which they stand. The negative interaction between the way people live and the "tendency to shake" of the earth beneath them could, as we all know, be considerably reduced by improving building techniques and standards.

Ancient peoples seem to have been aware of this to some extent. Strabo thus observed, in commenting on Philadelphia and the earthquake of 17 A.D., that it was amazing how some citizens remained attached to their city, in spite of their houses being so unsafe (Strabo 13.4.10).

a knowledge
of the long period

To assess these factors, it is necessary to have an overall knowledge of the historical sequence of natural phenomena. We know little enough about how this sequence has developed in the long term. When this knowledge is appropriately related to its background, it is possible to see how far certain events are exceptional, to arrive at a realistic definition of them, and to estimate the probability of their recurrence. From their interaction with the inhabited environment, we can not only deduce their role in history, but also work out a relationship with nature which is free from literary formulae and misleading historical interpretations.

Yet considerations on method alone, although indispensable to direct the resolution of problems, would not be sufficient: it is also necessary to build new foundations for broadly-based knowledge, directing them to a multidisciplinary use. Those who wish to tackle these problems must inevitably take due account of both the historical and scientific aspects of their discipline (and the same is true of the

study of other natural phenomena). From this point of view, history cannot be considered a self-sufficient branch of learning; and neither can seismology.

The seismic
catalogue tradition

Historical earthquake catalogues and lists constitute a sort of legacy from pre-contemporary seismological culture, and are of great interest for the history of culture and attitudes of mind as well as for historical seismology. In fact, they provide basic information for most historical earthquake catalogues currently in use, in the sense that the vast quantities of data concerning the time, location and effects of past seismic events have come down to us through this learned tradition.

Such historical lists, however, are not transparent collections of data which we can use unquestioningly. On the contrary, they are complex, stratified works — “containers” whose form depends on the different contributions made by scholars, natural philosophers and naturalists over a period of centuries. It is worth bearing in mind that although such writings became widely known at the time when printing was a mass phenomenon, especially from the 17th century onwards, they draw on much more distant and common sources. The first treatises on the subject (they often include lists of historical earthquakes) go back to antique and late antique times in the Mediterranean area. We know from Phlegon of Tralles (first half of the 2nd century A.D.), for example, that Theopompus of Synope had written a treatise *perì seismōn* (on earthquakes), which has unfortunately not survived. The work probably contained a variety of information on earthquakes, including some from earlier times: there were temple archives at Synope, and it may be that information about much earlier earthquakes was kept there in traditional annal form. The concept of the *prodigium*, which simply meant an event beyond the bounds of everyday normality, led to the gathering in late antique times of a great deal of information about earlier earthquakes. One thinks, for example, of the *Liber prodigiorum* of Julius Obsequens (4th century A.D.), which was often made use of in later times.

the ancient world

The earliest known modern earthquake catalogue for Europe and the Mediterranean area based on historical sources is the second book of the treatise *De terrae-motu libri tres* by Giannozzo Manetti (1396-1459), a Florentine humanist and politician. It was written in 1457 at the behest of Alfonso of Aragon, king of Naples, after Campania had been struck by a devastating earthquake on 5 December 1456. Manetti's treatise is preserved in seven 15th century parchment codices, four of which are in the Vatican Library, one in the monastery of S.Lorenzo de l'Escorial, one in Paris and one in the Krauss Library in New York (see Figliuolo 1988-89, vol.1, pp.223-7). The work did not circulate, however, perhaps because Manetti was condemned by the tribunal of the Inquisition a few years later (for his *De dignitate et excellentia hominis*). Underlying Manetti's great work is a learned knowledge of classical literary texts (though his medieval learning is much more confused). But because the work was not widely disseminated, it unfortunately failed to create a tradition, and remained an isolated achievement of the Italian Renaissance humanism. Earthquakes received a great deal of attention in the next century, and a good many literary and scientific works on the subject were produced. As far as catalogues are concerned, the availability of printing led to considerable fame for one work which was a direct heir of the interest in catalogues

humanists and scholars:
Manetti 1457

historical contexts

Principal earthquake catalogues involving the ancient Mediterranean area

authors	chronological span	area	events up to 1000
[1457] Manetti	Creation – 1456	Mediterranean	54
[1574] Ligorio	c.1000 B.C. – 1570	Mediterranean	93
1652 F. da Secinara	1509 B.C. – 1650	World	62
1691 Bonito	c.3700 B.C. – 1690	World	494
1743 Mongitore	1293 B.C. – 1740	Sicily	30
1840 von Hoff	3460 B.C. – 1759	World	200
1848 Perrey	325 – 1847	Italy	32
1850 Perrey	306 B.C. – 1850	Mediterranean	102
1853 Mallet	1606 B.C. – 1842	World	200
1861 Capocci	19 – 1858	southern Italy	23
1883 Mercalli	1450 B.C. – 1881	Italy	129
1881 Schmidt	1000 B.C. – 1838	Mediterranean	139
1892 Baratta	361 B.C. – 1888	Roma	32
1901 Baratta	1 – 1898	Italy	92
1906 Galli	900 B.C. – 1906	Latium	60
1911 Milne	7 – 1899	World	90
1932 Sieberg	2200 B.C. – 1930	Mediterranean	124
1934 Roux	211 B.C. – 1932	Morocco	5
1942 Morelli	3rd cent. – 1940	Albania	9
1950-1 Amiran	64 B.C. – 1951	Palestine-Israel	43
1961 Galanopoulos	2100 B.C. – 1798	Greece	49
1967 Ergin <i>et al.</i>	11 – 1964	Turkey	119
1973 Carrozzo <i>et al.</i>	1 – 1971	Italy	95
1974 Shebalin <i>et al.</i>	2100 B.C. – 1900	Mediterranean	107
1979 Ben Menahen	92 B.C. – 1980	Middle East	58
1980 Poirier and Taher	528 – 1760	Mediterranean	64
1982 Comninakis and Papazachos	479 B.C. – 1899	Greece	40
1984 Maamoun <i>et al.</i>	2200 B.C. – 1983	Egypt	18
1989 Papazachos B. and C.	550 B.C. – 1986	Greece	97

in late antiquity, as expressed, for example, in the work of Julius Obsequens. The work in question was the *Prodigiorum ac ostentorum Chronicon* by Conrad Lycosthenes, published in Basle in 1557 in what was for those days a luxury illustrated edition, which still attracts attention, primarily for the curious little figures which illustrate and divide the entries for the various earthquakes listed. Twenty years later, Manetti's classical erudition was echoed, though unwittingly, in another important treatise which still exists only in manuscript. It was written in 1574-77 by Pirro Ligorio and is now preserved in vol.28 of the Ligorio manuscripts in the Archivio di Stato in Turin. Amongst other things, the treatise contains the earliest known design in the West for an anti-seismic house (Guidoboni 1987). Ligorio is a famous name in the history of mannerist architecture, but he is also well known as a scholar, antiquarian, proto-archaeologist and even as a forger. As with Manetti, the occasion for his work was a strong earthquake — in this case the one which caused serious damage in the city of Ferrara on 17 November 1570. Ligorio was a guest at the court of Ferrara at the time. The treatise was never

printed, perhaps because it became “bogged down” in the tense atmosphere of a court which was accused of heresy by the pope at that very time and in relation to the earthquake which had struck the city.

Several centuries ago, when scholars began to take an interest in earthquakes, they adopted cultural attitudes which are no longer acceptable today. Their view of geography, for example, was a very broad one, and they were indifferent to language varieties and national boundaries (factors which have had a negative influence on the compilation of present-day national catalogues. Such works abound in 16th and 17th century Italy more than anywhere else (see, for example, Filippo da Secinara 1652), but the finest product of the 17th century was the famous *Terra tremante o vero continuatione de’ terremoti dalla Creatione del Mondo sino al tempo presente* by Marcello Bonito (Naples 1691).

Filippo da Secinara 1652

Bonito 1691

If we examine the way in which the information presented in such works is structured, however, it becomes clear that they are difficult to use. In spite of his impressive learning, Bonito applies pre-philological criteria to his use of sources, often preferring chronicles and annals from recent times to medieval sources. Nevertheless, his work is still of great interest for 16th and especially 17th century earthquakes, because he often quotes at length from archival documents which are now lost. There are even references to earthquakes in Japan, which Bonito had learned about from the annals of Catholic missions. An increase in scholarly specialisation in the 18th century resulted in more attention being paid to individual earthquakes. What interested scholars in particular, whether they were naturalists or philosophers, were the causes, effects and precursors of individual seismic events. In these circumstances, catalogues tend to act principally as providers of background information on local earthquakes. The Seyfart (1756) and Bertrand (1757) catalogues are an exception. A predominant interest in theory or in individual earthquakes is also evident in the mass of literary and scientific works which followed the famous Lisbon earthquake of 1755 and those in Calabria in 1783.

Seyfart 1756

Bertrand 1757

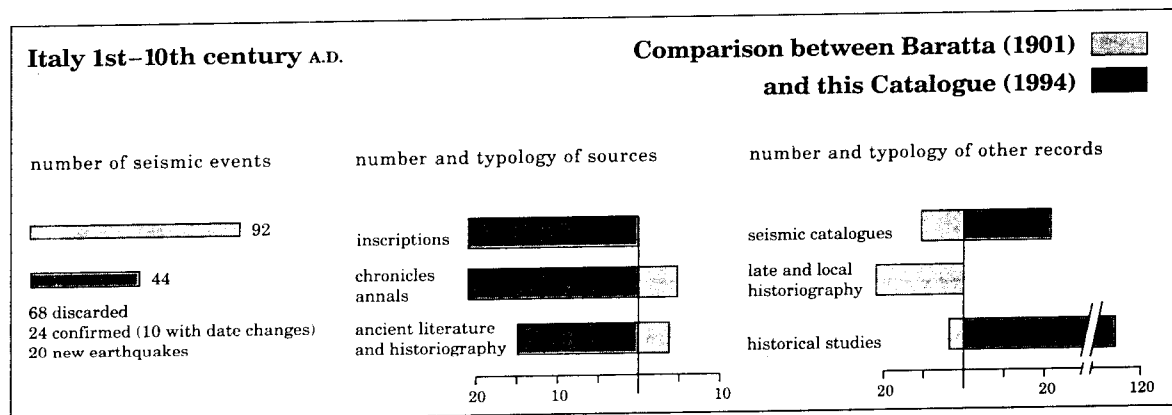
From the second half of the 19th century to the early decades of the 20th, there was a revival of interest in the compilation of historical earthquake lists on a worldwide or regional basis. These catalogues draw on the preceding scholarly tradition, but very often in an uncritical way; and it is from this second phase of study that present-day national earthquake catalogues have been “generated”.

The analysis of historical earthquake catalogues is thus not simply an academic aspect of current research into historical seismology, but rather a necessary contribution to the clarification and “decoding” of the complex legacy of information which has found its way by one means or another into present-day earthquake catalogues. As far as ancient Mediterranean earthquakes are concerned, the names of the pioneering scientists have become deservedly famous, for they brought order into our current knowledge of the history of earthquakes: von Hoff (1840) in Germany; Perrey (1848, 1850) in France; Mallet (1853), O’Reilly (1880-86), and Milne (1911) in the United Kingdom; Mercalli (1883) and Baratta (1901) in Italy. They brought second generation historical seismology data into being, by compiling the first “modern” earthquake catalogues; but they also contributed to the “stratification” of a great deal of often unchecked information, because of the temporal and geographical parameters they adopted for the earthquakes con-

the great 19th century
European school

Sieberg 1932
cerned. Sieberg's famous catalogues (1932 a,b) are an example of this. Striking for the breadth of their geographical and chronological span, they serve not only as a "catalogue collector", but also as a repertory of additional data whose source have since disappeared without trace.

This is the complicated and almost always extra-disciplinary way in which a base of historical data on series of historical earthquakes has been created. As instrumental seismology spread and became established, especially from the 1950s onwards (Kárník 1968), these data were reinterpreted using the parameters of instrumental seismology, thereby causing an appreciable loss of information, mistakes of a new kind, and a certain amount of confusion.



a complex and important tradition

The research underlying the compilation of our catalogue has obviously taken into account this complex and important tradition. In parallel with the identification and analysis of ancient sources, we have therefore also carried out an examination of those historical earthquake catalogues which deal with the period and area covered by us. Hence we have been able to include this specific bibliographical information in the individual earthquake entries, so giving the reader the additional possibility of assessing the scholarly tradition in historical seismology, which is obviously more sensitive to the problems concerned than the historiographical tradition.

The Mediterranean area over the long period

In order to compile a catalogue of ancient Mediterranean earthquakes, it has been necessary above all to take account of the different historical and cultural situations in which the sources of information about seismic events have been produced. These difficulties have not discouraged us from working in such a vast area, for when our research began with the Italian peninsula, we had already decided to extend our inquiries further afield. It was clear from the beginning that Italy could not be isolated from its natural Mediterranean context, even though its relations with northern Europe are deep-rooted and of distant origin (one thinks, for example, of Carolingian and Frankish times). The links which have knit the Mediterranean basin into a well-defined historical and cultural unity are an irrefutable historical fact. There is no doubting the administrative and political continuity provided by the Roman world over a period of centuries, the interweaving of written traditions, the circulation of Eastern and Western sources in the ancient

and late antique world, and the economic and cultural exchanges which have linked the Mediterranean countries. It was therefore a question of dealing with sources from the various countries of the Mediterranean together. One of the principal advantages of that decision is that it has been possible to analyse data in terms of ancient geography, while simply observing a chronological sequence and avoiding present-day boundaries and political allegiances. To the Mediterranean area, which was already the subject of our investigation, we have now added the region of Armenia; for the available sources for earthquakes in Armenia (and the neighbouring areas to which Armenian language sources refer) constitute a sort of cultural *continuum* with the Mediterranean. It is not a matter of simply extending the area covered by the catalogue, but of producing additional data to clarify the general picture. Armenian literature, which came into being in the 5th century A.D., thus acted as a link between local traditions with Iranian overtones and the Christian world — whether Byzantine or Syriac — from which it derived. But western scholars' scanty or imprecise knowledge of Armenian sources has up to now left the area in isolation. Consequently, we have thought it necessary to include the relevant sources, often correcting rough or unverifiable data, and keeping in mind the high level of seismicity which the sources often record for the Armenian plateau, in spite of the region's fairly low population density.

In its general lines, the picture we have of historical seismic activity is that it was characteristically a natural environmental link between the present-day countries of the Mediterranean. While the intensity of its manifestations might vary, it was a common element — as it still is today — amongst the different built environments of the Mediterranean. It is thus true to say that written records of seismic effects experienced over a period of time, and the reactions of the societies of the past to the problems created in their area by seismic activity, still provide us with a great deal to ponder on today.

The chronological period under investigation obviously stretches back deep into prehistory. For a very long time, myths not only conveyed their own many-faceted internal meanings, but were sometimes the only way in which isolated and transfigured echoes of major natural events were preserved; and scientific analysis sometimes succeeds in deciphering them. One thinks of the disappearance of Atlantis (maybe connected with the explosion of the Santorini volcano in the 16th century B.C.), the splitting open of the Tempe valley in Greece by Poseidon, the earth-shaker and god of the sea (Helly 1989), or the fabulous entry of the great horse (an animal sacred to Poseidon) into Troy as a symbol of the destruction which has been identified in the sixth level of the city — possibly that referred to by Homer (Rapp 1982). The transfigured echoes are linked to prodigies or events interpreted as such, as well as to predictions and oracular responses, and are superimposed in space and time on natural phenomena which then become metaphors. Because they abandon nature and pass into the memory of groups of men with new meanings, their form as natural phenomena is very difficult for us to identify. Only towards the 8th century B.C. do clearer datings and time spans occur in written sources in areas of Jewish and Greek culture. The same is true of areas of Roman and Italic culture from the 5th century B.C. With very few exceptions — one being the famous 13th century B.C. Assyrian letter from Nineveh (Ambraseys and Melville 1982, the earliest written evidence)

pp.35-6) — there are no historical documents for such distant ages in the Near East, and consequently any earthquakes dating to “mythological” times — i.e. to before the 8th century B.C., cannot be given serious consideration.

That does not mean, of course, that such sources must be completely eliminated. On the contrary, they are very important indicators of the way in which seismic events were perceived by the ancients. But for that very reason, they must be analysed separately and, in particular, they cannot contribute to the compilation of an earthquake catalogue.

The historical sequence in this catalogue ends just before the year one thousand; but that date had no particular chiliastic significance and was given no particular emphasis at the time. The famous fear of the year one thousand is actually a very late western historiographical invention, and there is no trace of it at the time — not even when the Latin chroniclers record the occurrence of some great destructive earthquake, such as that which struck southern Italy in 990 (or 989). If anything, we can detect an increased interest in the actual description of what happened; and this may be partly a sign of population growth and economic developments in Italian cities as we approach the 11th century.

Modern trends in historiography — we are thinking in particular of “nouvelle histoire” and the debate to which it has given rise — have heightened the sensitivity of the historian, leading him to seek out and elaborate new models, and to establish contact with scientific disciplines. However, while it is true that the meeting of scientific and humanistic disciplines has sometimes borne fruit — the history of climate is a case in point — in the specific case of historical seismology there are still many gaps for academic historians to fill.

the earthquake as a
historiographical problem

With a few outstanding exceptions, such as the 62 A.D. earthquake at Pompeii or that in Crete in 365 A.D., and to some extent the one at Sparta in c.464 B.C., ancient and medieval historians have not shown the sort of interest in the economic effects of earthquakes that one would find in modern, and especially contemporary historians. We find a certain disregard for certain phenomena even though they involved many urban societies in ancient and medieval times. This disregard seems to have something to do with the traditional attitude of historians, who ascribe a “static” quality to the ancient and medieval world up to about the 13th century. Earthquakes are seen as exceptional occurrences, but only their dramatic onset is recorded, and the succeeding long period of reconstruction, which may have involved changes of site, depopulation and repopulation, is neglected. Yet this long period is an integral part of the economic history of the area concerned. Earthquakes may perhaps have been seen as the cause of great changes — though there is little justification for such a view, as we have pointed out — and yet at the same time little interest has been taken either in the changes they have caused at local level or, by and large, in their effects on social life, such as, for instance, the refugee problem after collapses, and in particular the social changes brought about by massive rebuilding work. Whole generations of artisans, carpenters and masons could occupy a site for years, causing migrations of workers — particularly skilled ones — and inevitably affecting the social and economic life of a city and its territory.

A reading of our catalogue — limited as it is to cases documented in the sources —

will demonstrate the importance of this phenomenon; yet in current historiographical work the predominant image of both the urban and rural environment continues to be one of immobility. Lacking any really reliable sources for research into population levels and movements, the historical seismologist has great difficulty in discarding the strait-jacket of theory and abandoning the categories of “town” and “country”, which have indeed a decisive role in disciplines such as sociology, geography and town planning. An increasing interest in the history of landscape, however, is helping to break down these entrenched positions. Even though many historians continue to use the traditional categories, one notices a move towards the acquisition of others of a less schematic kind, and greater attention being paid to areas which are “marginal” or, more often, have been marginalised by modern historiography.

The lack of sources has certainly made it difficult to imagine, let alone reconstruct, the economy of an area struck by a devastating natural disaster (including floods and famine); but we think there is perhaps less justification for historians’ neglect of the power relationships which controlled and conditioned restoration and rebuilding processes. While the problem could not be dealt with if we limited ourselves to minor buildings, we would surely have a much better chance of saying something useful about major public works, such as monuments, religious foundations and fortifications, where rebuilding and restoration work is documented in literary, epigraphic and archaeological sources. But since studies of these buildings have for the most part been of a descriptive kind, it is difficult to ensure that a satisfactory historical assessment of these often complex building and rebuilding processes is achieved. Although an earthquake is very much a dynamic event, it seems once again to have no place in an economic and social history based on a “static” view of things.

reconstruction
and economic processes

Attitude and expression in the sources

Before investigating interpretations of earthquakes in the Mediterranean world, we would perhaps do well to consider the problem of the reliability of written sources. As we have already seen, the need is here posed to combine the approaches of the scientist, historian and textual scholar. While on the one hand it is unthinkable that we should analyse the data provided by the sources without a suitable understanding of seismic phenomena — though this has been done, and has not uncommonly produced results which were unreliable even from an antiquarian point of view — neither must we consider the texts as simple descriptions of events. However strange it may seem, when we try to decipher the message conveyed by the sources, we must keep as close as possible to the codes they adopt — even taking account of their “silence”, if necessary.

Most of the written sources used in this catalogue are of a literary kind. There are relatively few inscriptions which refer directly to earthquakes, though there are many more which allude to collapses and rebuilding, and these constitute “secondary” but no less important evidence. The same is true of Roman coin issues which record imperial contributions to reconstruction. As for administrative documentation on papyri, ostraka, waxed tablets and so on, no useful “primary” evidence has

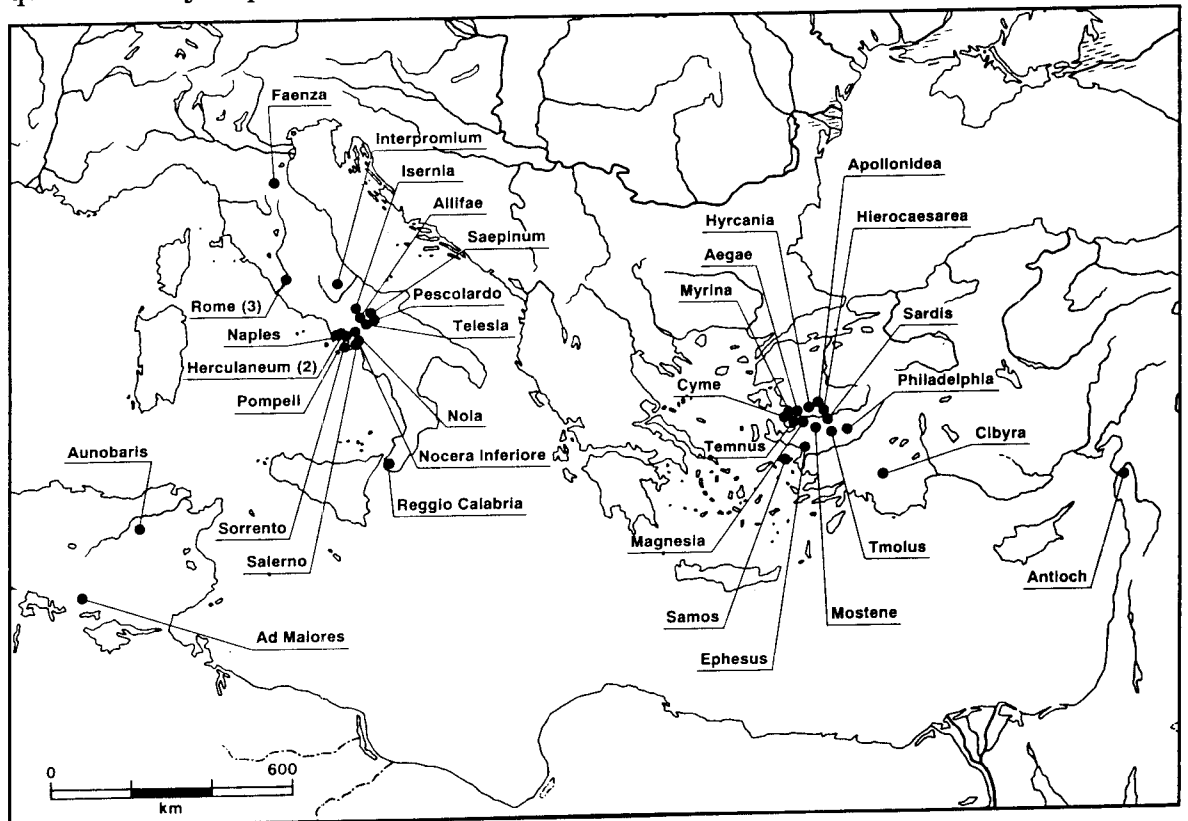
been found. Nevertheless, their study may provide important clues about economic changes in the territories concerned, and suggest ways of reconstructing a post-earthquake situation in economic terms.

While most texts which record an earthquake were written later than the events they refer to, we occasionally find contemporary evidence, if not actual eye-witness accounts. One of the most striking texts is undoubtedly the letter in which Pliny the Younger recounts the death of his uncle, Pliny the Elder, during the eruption of Vesuvius in 79 A.D. However, where such ancient documents are concerned, the rule of textual criticism "*recentiores, non deteriores*" applies. In other words, we must not consider a piece of information to be less important simply because it is found in sources from several centuries later.

the sacred value
of written texts

Both in antiquity and the Middle Ages, the written text had an almost sacred value; and while it is true that there are cases of falsification (recent texts made to seem more reliable by being disguised as ancient), the materials gathered and selected by historiographers and chroniclers can in general still be regarded as reliable. If there were mistakes, they were made when manuscripts were copied (numerical data are nearly always suspect); but this is a problem common to all ancient literature, since we scarcely ever have "originals" available until the early Middle Ages.

The selection of data by the sources is in any case of vital concern if we are to understand them correctly. For what we judge to be important may have been less so for the ancients, since theirs was an essentially urban culture. We would be mistaken, however, if we thought that these lists correctly registered all earthquakes of any importance. Earthquakes themselves were seen as inevitable natu-



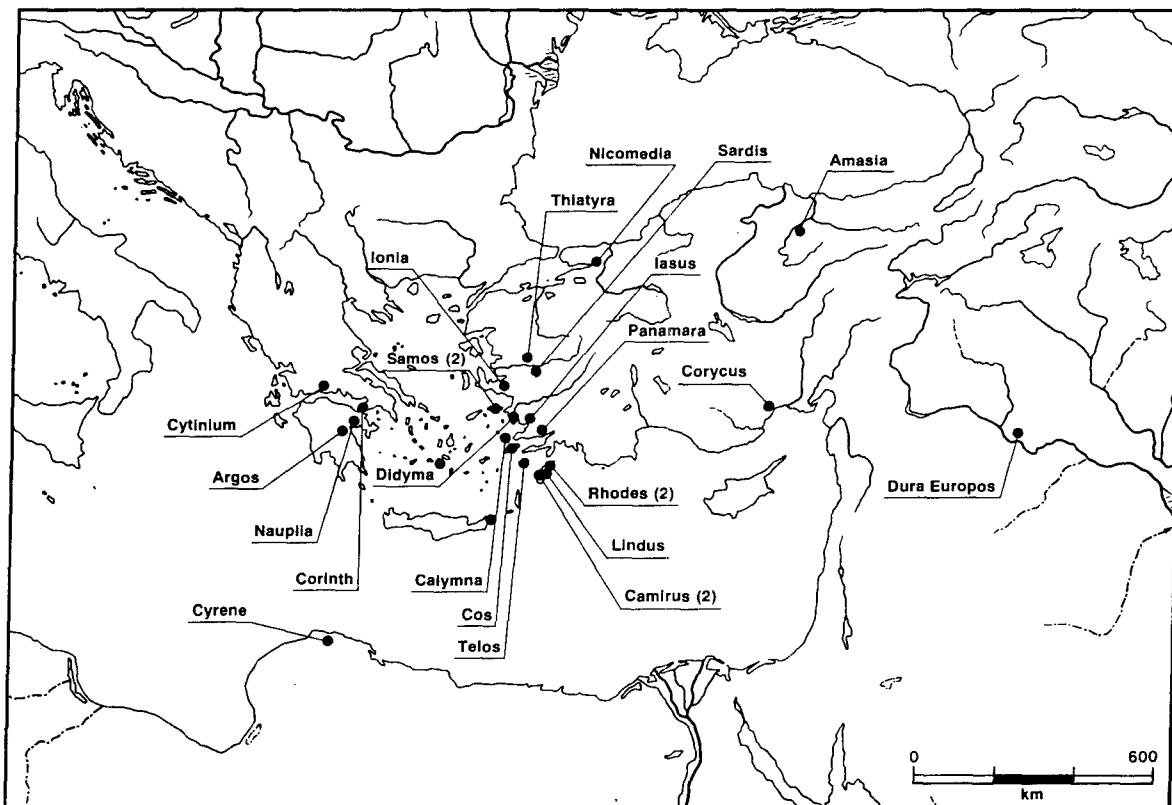
Places referred to in Latin inscriptions concerning earthquakes quoted in this catalogue.

ral phenomena; so the distress aroused at the time gave way to resignation. In the Greek world, only those events which in some way interfered with human activity were recorded for posterity. Thus, in Greece, reports of earthquakes included very minor ones, perhaps because they held up the advance of an enemy army, which then interpreted the occurrence as an ill omen and withdrew (Herodotus 5.85.2; Xenophon, *Hellenica* 3.2.24), or because an assembly had been interrupted (Thucydides 4.52.1). Whether or not a phenomenon was prodigious had to be decided by the priests as current circumstances required; so collapses with victims might be viewed with indifference, whereas phenomena regarded as miraculous were to be countenanced with a sense of submissive awe.

Minor seismic effects were more likely to be recorded if they were felt in a large city, than major destructive effects in a small town.

In republican Italy, we know of reports of earthquakes in various towns, because they appear in the prodigy lists of the different *municipia*. These lists include earthquakes, abnormal births seen as portents, and indeed anything which could be interpreted as a sign from the gods. Writers such as Livy, Dionysius of Halicarnassus and Dio Cassius (not to mention Julius Obsequens and his fundamentally important *Liber prodigiorum*) have passed down to us lists of prodigies recorded in the territories of the Romano-Italic confederation. As MacBain (1982) has pointed out, prodigies undoubtedly conveyed an ideological and religious message, and also constituted a “vehicle for the communication of politically charged messages between Rome and the Italian allies, tending to weld the confederation together into a psychological unity”.

Let us take an example of this. For the year 100 B.C. Obsequens records a destruc-



Places referred to in Greek inscriptions concerning earthquakes quoted in this catalogue.

tive earthquake in Picenum, involving the collapse of houses: "an earthquake caused houses to collapse in ruins in Picenum, and some, though shaken, were left leaning at an angle" (Obseq. 45). The prodigy lies not in the collapse of some houses but in the fact that others, though shaken at their foundations by the upheaval of the ground, remained standing at an angle. Not all earthquake disasters were necessarily seen as prodigious. Indeed, any event which was interpreted as prodigious required an appropriate expiatory ceremony. The occurrence of an earthquake — not an unusual event in Italy — was not sufficient in itself: it had to be in some way "abnormal".

The ancients were shocked at the sight of houses which failed to collapse but were left leaning at an angle because their foundations had been disturbed. To the ancient imagination, the sight of buildings leaning beyond the point at which their centre of gravity permitted a state of equilibrium, must have suggested that they were observing an *adynaton* — an impossible event. Such an event made a deeper impression than an actual collapse, for the latter was, after all, just one of the disasters of everyday life. The *prodigia* recorded in republican Italy were basically events of this kind. The leaning houses in Picenum, or the more frequently recorded phenomena such as the swaying of the spears of Mars in the *Regia* in Rome, were caused by distant earthquakes or low-energy shocks. This needs to be taken into account in any overall seismic assessment.

The unification of Italy at the beginning of the 1st century B.C. made these prodigy lists less important, and hence the textual evidence for earthquakes becomes less frequent from precisely that time onwards. Writers seem to have switched their interest to Greek language areas, where the success of naturalistic literature had kept alive the memory even of the earliest events.

The recording of seismic events in both the Greek and Roman worlds was thus subject to a selection process on the basis of the above interpretative criteria. And then there are political and economic factors to be taken into account.

It is no coincidence that a disaster such as the earthquake which struck Campania in 62 A.D. created such an impression that it led Seneca to devote a whole book of his *Naturales quaestiones* to earthquakes; for in spite of the fact that only small and medium-sized towns in Campania were affected, the area contained much sought-after luxury villas belonging to the family of the emperor and the Roman aristocracy.

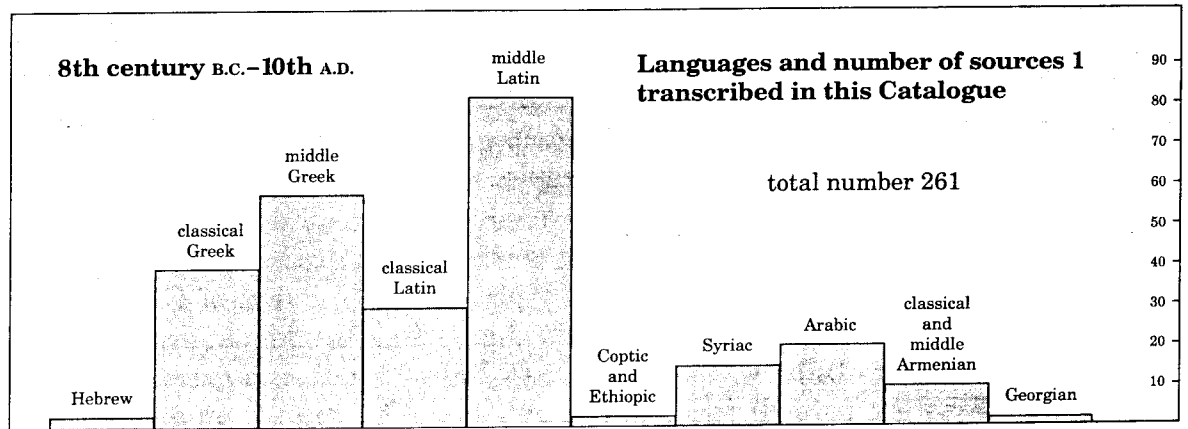
classical antiquity Throughout classical antiquity, then, we have narratives — usually of a historiographical kind — which allow us to establish fairly accurate datings for seismic events. The same is not true of inscriptions, however, for as we have pointed out, very few of them refer specifically to an earthquake, though a great many refer to the reconstruction of a building. These inscriptions are naturally concerned with public buildings, monuments or fortifications. Minor buildings are never mentioned, with the result that we have to rely on archaeology for evidence about them. The above is true of both Greek and Latin inscriptions. In the case of Latin inscriptions it has been possible to establish a catalogue of those relating to earthquakes (*Catalogo epigrafi* 1989). But it has not yet been possible to do so in the case of Greek inscriptions, because of the very scattered nature of collections and publications. We can at least say with a reasonable degree of confidence, however,

that inscriptions paid little attention to earthquakes, for the principal interest of the ancients lay in the extent of a collapse and the rebuilding costs. If the collapse of a public building were the result of an earthquake and not, let us say, of old age or decay, its destruction might be recorded in order to stress the extent of the damage. Such might be the case, for example, if the destruction were extensive enough to lead to tax exemption or to a special subsidy from the authorities. But, generally speaking, the cause of the collapse was not considered sufficiently important to be worth including in a public inscription. The advent of Christianity seems to have been accompanied by a certain change in attitude and expression in the sources. The new code of values obviously brought with it a greater need to see natural disasters as a divine punishment, and Christian “humanism” may originally have created a need to give consideration to details such as the number of victims, which had previously been considered of no consequence. Jewish literature already showed a heightened consciousness towards seismic effects which was subsequently transmitted to the whole of the Christian East, as well as to Islam.

This greater attention to earthquakes seems to be at least partly related to the increased sensitivity towards nature and the natural environment which one finds in late antique literature. It is certainly the case, at any rate, that the richest body of evidence comes from Graeco-Oriental works, which themselves derived from local chronicles. Hence there arose in Anatolia and Syria around the 4th century a new historiographical genre, which was subsequently destined to exert a profound influence on Christian historiography. The chronicles on the one hand, and the lives of the saints which flourished as independent works or as brief accounts on the other, came together in liturgical texts such as synaxaria and menologies, thereby creating a richer fabric, and one which was, on the whole, more sensitive to seismic phenomena.

It is no coincidence if, from the 4th to about the 6th century (a period which coincides with the flowering of Greek and Syriac chronicles), the available evidence about earthquakes definitely seems more confused, sometimes artificially duplicating seismic phenomena, and generally beset by an almost impenetrable textual, topographical and chronological confusion. This confusion arose from the typical coming together in late antiquity of a number of different cultures. Not only Christians and pagans had their different chronological systems, but also individual peoples and even individual cities. In Hellenistic and Roman times, every important city had its own era, whose starting point was some epoch-making event, and so numerous different calendars often existed at the same time.

Rivalries between cities, which were typical of imperial times and continued throughout late antiquity, added to the confusion. The efforts made by Christian and Byzantine chronographers to adapt calendar dates to the new era of the Creation demonstrate how difficult it is to reach reliable conclusions about many dates, and there is an additional margin of error resulting from misreadings by copyists and writers themselves. The numerous Syriac chronicles, which are linked in one way or another, give an idea of the imprecision which arose, especially when observations were being made not in a city abounding in archives and libraries, but in an isolated monastery without any codices. The same is true of Armenian chronicles, though generally speaking they are of later date and derive



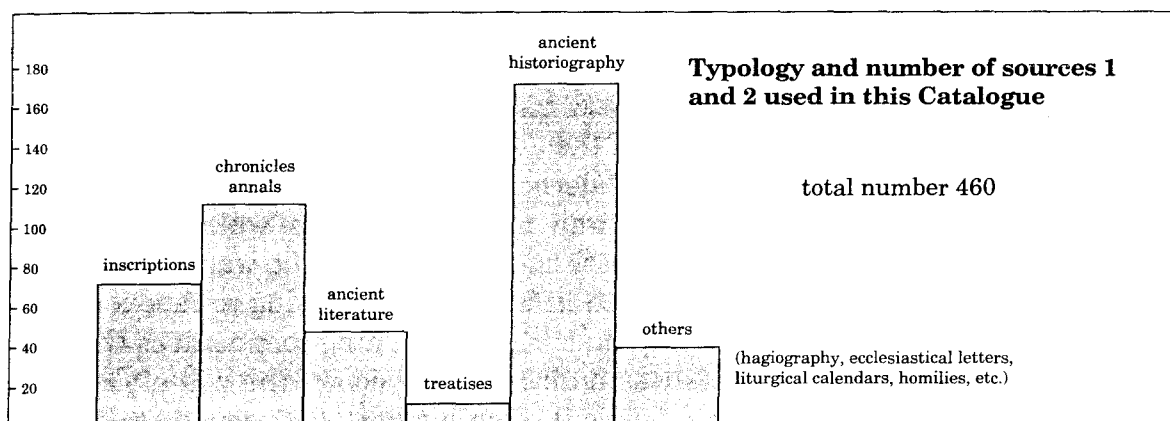
from texts which have often disappeared.

However, Byzantine chronicles up to the 10th century maintain a certain balance between narrative and chronology. Writers like Malalas or Theophanes took pains to record the dates of the prodigies, amongst which earthquakes undoubtedly predominate. As a general rule, at any rate, historiography continued to be of an annalistic type until about the 11th century. It was only later, when that type of historiography was in decline, that prodigious phenomena began to be recorded in marginal notes (*notulae*), which helped to make up for the increasing poverty of data as to time and place. The same is true of colophons or closing notes in manuscripts. The frequency of their use (it is exceptionally high in Armenian manuscripts) has long been recognised, but these texts still have not been thoroughly investigated (the most thorough attempt is Schreiner's work on what are known as the Byzantine *Chronica minora* — see *Information concerning the authors of the sources* in this volume).

Latin medieval
sources

From a typological point of view, early Latin medieval sources are extremely varied. They include monastic chronicles and annals, papal deeds, registers, notebooks and *notulae* written in the margins of codices. Hagiographic works have also sometimes provided items of information about seismic effects; but the lives of saints and martyrs have been used in this catalogue only in the rare cases where their narrative contains some specific piece of historical evidence. We have found on the whole that more sources are available for northern Italy than for the south and the islands. This seems to be due to the fact that there were more monasteries with important *scriptoria* in the north, and they have passed down a well-preserved annalistic tradition. The evidence provided does not necessarily refer solely to local events. The fact that one sometimes finds references in the annals of a European monastery to a quite distant earthquake encouraged us to broaden our research a great deal, and to make a systematic evaluation of annals and chronicles north of the Alps (see *Annali e cronache dell'Europa medievale*, in Guidoboni 1989, pp.280-5). We found that some items of information had passed through several stages of oral transmission before being written down, and that a manuscript might travel and its later owners note down in it all sorts of matters which they thought worthy of interest.

Information about building collapses resulting from earthquakes is rare indeed in early medieval Latin sources; though there is more frequent documentary evidence of collapses for which no cause is specified. One might well expect sources of



this kind (mostly benefices, petitions, donations or contracts) to provide more specific information, but it often happens that detailed chronological and geographical information, and the mention of specific buildings (nearly always ecclesiastical or monastic buildings, plus the occasional castle) is not accompanied by an indication of the *cause* of the collapse. As far as we can judge, moreover, the tenor of the documents in many cases does not allow us to ascertain the contingent reasons for a piece of rebuilding, or a donation, or a benefice in favour of an ecclesiastical building which had been badly damaged or totally destroyed. Thus we do not know why the church of San Filippo di Terrati at Lago (in the Province of Cosenza, Calabria) needed to be rebuilt, as it was in 1070, when Robert Guiscard made a donation of land and money. We are simply told that the church was in a dilapidated and ruinous state (Ménager 1980).

Similarly, there is a document of 1073 (P.F.Kehr *Italia Pontificia*, p.176) which tells us that the cathedral at Asti was *collapsa*; and the church of Sant'Angelo at Pistoia (Tuscany) was *destructa* in the early decades of the 10th century. Many such cases can easily be found by examining registers and documents. Were they the result of earthquakes? War damage? Wear and tear? It is impossible even to guess without having any other information.

collapses with unspecified causes

There are also papal documents which mention collapses and rebuilding, without specifically explaining how or why. At the time of Hadrian I (771-795), records show that rebuilding work was carried out on towers and walls near Rome which had completely collapsed: the pope, we read, restored many ruined churches and towers both inside and outside the city of Rome (*Liber pontificalis*, p.501). Perhaps the pope's role as restorer is being exaggerated; but even if matters were not as serious as they sound, the fact remains that many buildings were in a state of disrepair, and there is confirmation of this in other sources. Yet for those who wish to understand and distinguish between the various causes, the picture remains unclear.

It may be that some collapses were caused by factors solely relating to statics and the state of repair of the buildings concerned, without any traumatic events being involved at all. We know, for example, that the Lateran basilica in Rome collapsed *ad terram de toto* in 896 because of the slow ravages of time, as an inscription clearly indicates (*inclinata ruit senio volventibus annis* — see Marmo 1989 b, p.303). In the 16th century, its collapse was thought to have been the result of an earthquake, but that is just an example of the many late and fanciful explanations

of structural problems in famous ecclesiastical buildings. The basilica was subsequently restored in the time of Sergius III (904-911).

In certain contexts, the language of the sources sometimes acquires a fantastic and miraculous dimension, as in the case of the *Chronicon Salernitanum*, a 10th century work by an unknown monk from Salerno; and we may be led to suspect that seismic effects are being transmuted into miracles. Thus we read that the Saracen tyrant Abdila met a sudden death in 870-872, when he was crushed by a beam which fell from the roof of a church in which he was trying to rape a virgin. The monk who is recounting the story makes an interesting comment: so that the Saracens could not deny that this was a direct expression of the will of God and claim that it was just an accident, "since it often happens that churches collapse from old age, God himself caused the walls to collapse as well, and opened up a fissure not far from the altar". Old and decaying buildings were apparently to be found in many different places; and it also has to be pointed out that any possible evaluation of seismic effects is complicated by the fact that what mattered to those early witnesses was not the general seismic scenario, but some specific place within it linked to the presence of a saint, a person in a position of power, or a life history which was being narrated. What we are told, therefore, is decided more by the extent to which the earthquake fits the narrative than by the extent and seriousness of its effects. Thus the part played by the earthquake within the context of the narrative is very like what we have already seen in ancient literature.

In a turbulent period of history such as that of the 9th and 10th centuries, with its wars, raids and invasions, the impoverishment of administrative and economic organisation and a significant fall in population, the effects of natural disasters on buildings in cities probably came on top of long standing neglect. Since many buildings were made of wood, there may well have been collapses which did not cause any deaths, thereby largely depriving strong earthquakes of the devastating effect they were to have in later times; or the collapse of very old stone buildings may have been seen as a "providential" opportunity for acquiring second-hand building materials.

Not uncommonly, an earthquake is mentioned in early medieval sources more as an additional form of discomfort in a social situation that was already profoundly uncomfortable, than as a direct cause of damage. We have the impression that the principal effect of an earthquake was to cause alarm in a situation which had already been made difficult by other disasters and problems of social organisation.

the problem
of literary sources

The scientific reader may perhaps be surprised to find that works written centuries after the event are cited as basic evidence in this catalogue. While this happens much less frequently for the Middle Ages, where information from contemporary chronicles is available, it is almost the rule for antiquity. We have set out above the reasons for this special situation regarding ancient sources, pointing out the ambiguities involved in such texts and the traps they set for us, and drawing attention to the validity of the rule applied by textual scholars that the value of a text very often has nothing to do with its date. Where historiography is concerned, it is important to keep in mind the working practices of the individual author. For example, a historian like Dio Cassius, who was writing at the beginning of the 3rd century A.D., could consult primary documents such as the Rome archives and local

chronicles, and hence leave us extremely valuable information about earthquakes in republican and imperial Italy. The same can be said of the Byzantine chronicler Malalas (6th century), who consulted one or more local chronicles of the city of Antioch, and so provided us with valuable information about seismic events which occurred there.

Furthermore, there are times when these late sources are the only ones which allow us to establish with accuracy the time and place of an earthquake. In other cases, authors who are earlier or even close to the time of the event have only left brief references to earthquakes, while later historiographers have passed down very valuable traditions, often preserving details which are important for the understanding of an earthquake.

These considerations show why, for the period covered by this catalogue, it is not always possible to define sources as “primary” or “secondary”; and in any case, the value of each text has to be assessed in relation to the individual earthquakes to which it refers. Hence our catalogue entries list literary sources under the comparatively neutral headings “sources 1” and “sources 2”, each case being dealt with individually. The reader will quickly notice that the sequential relationship between the sources varies a great deal, depending on whether we are concerned with classical antiquity, late antiquity or the early Middle Ages. In the case of the last of these periods, the separation is clearer in the West than in the Byzantine world, where the historiographical tradition remained attached to late antique models.

primary and
secondary sources

For lack of a more satisfactory criterion (it would certainly be dangerous, given the breadth and variety of the sources used, to arrange them in order of importance), we have listed sources in chronological order (though in some instances there is doubt about the dates of sources: see *Information concerning the authors of the sources* for individual cases). For obvious reasons, the comments in catalogue entries cannot follow the same criterion, especially where the available evidence requires a more complex historical analysis.

The measurement of time in ancient calendars

Establishing the exact chronology of earthquakes which occurred at different historical periods and in different cultural areas is very important if an earthquake catalogue is to be of value. Failure to pay due attention to the question of chronology can often lead to three kinds of distortion: 1) earthquakes may be artificially duplicated; 2) separate tremors may be mistakenly conflated; and 3) there may be a failure to recognise the nature of certain sequences of events (earthquakes occurring simultaneously or in close succession, etc.). In view of the fact, however, that the scarcity of available information necessarily makes this catalogue very incomplete, only the first two kinds of distortion concern us.

The use of different calendars which are not directly convertible into those in use today is a constant hazard. The fact is, indeed, that even today different Mediterranean peoples use different calendars, and we are still a long way from arriving at a uniform system of measuring time. However, while we now have a fixed point of reference (GMT – Greenwich Mean Time) derived from an agreed

a different
concept of time

international convention (1884), fluctuating terms of reference were the norm in the ancient world. In compiling this earthquake catalogue, we have naturally paid due attention to chronological computations, but we have also tried to situate these ancient calendars in their cultural context; for, in our opinion, the question of chronology cannot be isolated from the mentality which created it. Establishing when something happened, in the ancient world, was not just a matter of arithmetic: in many cases it meant making choices, attributing meanings, or establishing relationships. That is why we have not dealt with the chronological problem simply by supplying bare bibliographical information (which is in any case usually well known to historians, though scarcely ever to seismologists), but have thought it worthwhile to set out, at least in general terms, the characteristics of the principal eras of the ancient world, thereby bringing into focus the chief problems which various dating methods were intended to solve. This seemed to us a way of clarifying one particular quality of all the ancient sources used in this earthquake catalogue: that they are not concerned with *accuracy* in the sense in which we use the term today, that is to say something expressible in numerical terms. What we find instead is a kind of "clear indeterminateness" or "vague accuracy", if we may be permitted to use such paradoxical phrases. This quality is a function of ancient cultural systems, and it creates great difficulties for us when we use our observational paradigms in relation to different cognitive worlds. Even when the references provided are precise in their terms and we have the necessary tools for understanding them, there is always a fairly wide margin of error which we have to accept. But we are perfectly well aware that the existence of a margin of error does not mean that the data are incorrect.

It is characteristic of the earliest chronology that there was no fixed point of reference in relation to which events could be computed as earlier or later. In other words, chronological systems were relative, and measurements of time were made in terms of reciprocal relationships (Cosentino and Palumbo 1989).

Greece and Rome

In Greece, the system of counting years in terms of the cycle of Olympiads was introduced by the Sicilian historian Timaeus in the third century B.C., but it is clear that lists of victors at the Olympic games already existed. This chronological system begins with the year 776 B.C., when the Olympic games were founded; and from then onwards, they were held every four years, until their abolition at the end of the 4th century A.D. From Timaeus onwards, all the chronologies of the ancient world use the Olympiads as the basis of their calculations, and other dates are modified to fit the system. Since the Olympic year begins in the summer, however, dates in Greek history often have two numerical values when expressed in terms of the Christian era.

When the emperor Theodosius I issued an edict in 391 A.D. closing all centres of pagan worship, one of its consequences was the abolition of the Olympic games three years later, though the Olympiadic system continued to be used in Byzantine chronography.

The days of the year were not arranged in the same way in all parts of Greece, but at least all computations were based on the lunar cycle. Each month consisted of either twenty-nine and a half or thirty days; and there was an annual difference of

seven and a half days between the lunar and the solar year, which was adjusted every eight years by intercalating additional months.

The year in Rome always began on the first of January and, from 153 B.C. onwards, the two consuls also took up office on that date, so that the new year was identified by their names. From 222 B.C. until 153 B.C., however, the consuls took up office on 15 March. The later practice was followed until 541 A.D., when Flavius Basilius Junior became the last consul in Rome.

In the imperial age, the year could be identified not only by means of the names of the consuls, but also by reference to the names of the emperors when accompanied by a statement of their tribunician power and imperial acclamations, as well as by the various titles that were conferred on them.

In the Roman world, the phrase *ab Urbe condita* (since the foundation of the city of Rome) did not indicate an era, though the expression certainly provides us with a valuable system for linking events chronologically. The Romans used the year of Rome for measuring the length of time that had elapsed between an occurrence and the foundation of the city, but they did not make use of this as an era, because there was debate as to when the foundation of the city had actually taken place. Generally speaking, Latin historians thought the city had been founded between 759 and 748 B.C. The predominant traditions were those of Cato, who dated the foundation of Rome to 21 April 752 B.C., and of Varro, who dated it to the same day but in the year 753 B.C. This latter was the dating which prevailed over all the others. It had been established by Atticus in his annals, and after they were brought to public attention by Varro, it acquired official status and was preferred by historians. 21 April was traditionally held to be the anniversary of the foundation of Rome, and the *Paliliae* were held on that date.

The list in the *Fasti Capitolini* records the number of years *ab Urbe condita*, but the figures given are one year less than those provided by Varro, because the consular years have been made to fit the civic years, the former beginning on 1 January, but the latter on 21 April. Thus the consular year cuts across two civic years. That is how the years are counted in the *Fasti Capitolini*, where the foundation of the city seems to be dated to 752 B.C.

As for the *Fasti Romani*, they have been preserved without gaps for 1047 consular years from Brutus to Basilius Junior. The *Fasti Consulares* of the Roman republic have come down to us in three texts from the Augustan age: in the *Fasti Capitolini*, an inscription in the Forum which has survived in part and been added to with the aid of later calendars (the 5th century *Fasti Hydatiani*, the 7th century *Chronicon Paschale*, etc.); in Livy and Cassiodorus; and in Books 11-20 of Diodorus Siculus. All of these probably derive from a single original.

In early times, the Roman year was divided into ten months, but the months *Januarius* and *Februarius* (January and February) were added from the 5th century B.C. onwards (or earlier, according to tradition). These twelve months were lunar and gave a total of 355 days, but at the time of Caesar, the calendar was in such a state of confusion that something had to be done. Hence from 1 January 45 B.C. a 365-day year was introduced, by distributing ten extra days amongst the various months. This *Julian Year* was introduced gradually by the Roman government into all provinces. In the West it replaced the previous chronological system,

while in the various regions of the East, the calendar then in use was modified to fit the new system. This Julian calendar remained in use until the Gregorian reforms of 1582.

the days The days were counted by reference to three particular days: the Calends (*kalendariae*), which was the first day of the month; the Nones (*nonae*), which was the fifth day of the month (except in the months of March, May, July and October, when it was the seventh day); and the Ides (*idus*), which was the thirteenth day of the month, except in the four cases mentioned above, when it was the fifteenth day.

The word *kalendariae* comes from the verb *calare* (to call or shout); for on the first day of the month the *Pontifex* proclaimed on what day the Ides would fall. And from *kalendariae* comes the word *kalendarium*, which was the name given to the book which recorded when sums owed fell due. It was the *fasti*, on the other hand, which were effectively a calendar, for this was a list of days originally in the sole custody of the *pontifex maximus*, but made public after 304 B.C. The list indicated the days when it was permissible to administer the law (*fas*), and after it came into the public domain, each day of the year was marked "f" (*fastus*) or "n" (*nefastus*).

The Nones always fell on the ninth day before the Ides (it should be kept in mind that the Romans included both the first and last days in their calculations), and was therefore either the fifth or the seventh day, depending on the month. Varro thought that *idus* was a word of Etruscan origin, and that it meant the middle of the month. These three basic dates were used for calculating all the other dates in the month, the other dates being arrived at by counting how many days there were before the next base date.

the hours The hours of the day were calculated from dawn, and those of the night from dusk. In subdividing the day into hours, the Romans added to the number of hours certain habitual phrases which served to specify particular moments of the day (the hour of dinner, before cockcrow, and so on). In the Roman world, the day was divided into two: there was a diurnal period (*dies*) and a nocturnal period (*nox*). The *dies* was divided into twelve hours (*horae*), and each hour was a twelfth part of the time between dawn and dusk, with the result that the length of an hour depended on the time of the year. The night was divided into four *vigiliae*, from the turns of guard duty in a military camp, and like the *horae diurnae*, their length depended on the time of the year.

the earliest Christian world eras Two basic elements affected the way in which Christian world eras took their form: the first of these was purely religious, and the second was both religious and astronomical at the same time. Those calendars which are based solely on the religious element draw a parallel between the history of the world and the six days of creation in the Bible (*Gen.1.1-32*), and so make each day of the week in the Creation correspond to a thousand years in the history of the human race. The Incarnation is placed roughly in the middle of the sixth millenium, the end of which would bring the end of the human race and the beginning of eternal rest (the Epistle of Barnabas, Irenaeus, Clement of Alexandria and Hippolytus; see Grumel 1958, p.3). In this system, the number 6000 assumes a powerful significance of a sacred and eschatological kind, thereby supplying Christian chronologers with a standard measure for calculating the age of the world.

The second element involved in working out world eras again derives from religious needs, but is also inextricably linked to astronomical computations. Its point of departure is the debate about the celebration of Easter, for on that depends the whole liturgical calendar, as it developed in the various Christian churches from the 2nd to the 8th century.

In 325, the Council of Nicea tried to put an end to disputes about this question, by ordering that Easter should be celebrated on the Sunday following the first full moon after the vernal equinox. The problem lay in relating the story of the Passion in the Gospels, where it is dated in terms of the Jewish lunar calendar (14 Nisan according to the chronology of John, or 15 Nisan according to the Synoptic Gospels), to the liturgical requirements of Christianity, which are governed by a solar calendar. The lunar year is approximately 11 days and 6 hours shorter than the solar year; and so, to avoid the date of Easter advancing perpetually through the days of the solar calendar, Christian chronologists began working out what are known as the Easter “tables” or “cycles”, from the beginning of the 3rd century onwards. These are series of years (the precise number of years in an individual cycle varies: it could be 112, 84, 19, 28, 95 or 532) at the end of which the total number of days in the solar years concerned is the same as the total number of days in the corresponding lunar years, this being achieved by inserting into the lunar years, at regular intervals, what are known as intercalary or embolismal months (*embolismos* = intercalation); and use is also made of other devices such as the *saltus lunae*, which eliminates the discrepancy between the course of the sun and that of the moon by artificially increasing the age of the moon. In this way solar time and lunar time could be realigned at the end of a cycle; and so the Easter dates established at the beginning of the cycle could be taken over unchanged in later cycles. It could be held that an Easter cycle always underlies a world era, because the era is a multiple of the number of years in a cycle. It has to be kept in mind, of course, that the calculation is based on the assumption that the birth of Christ took place 5500 years after the world was supposed to have been created, and that the Creation must have occurred round about the middle of the sixth millennium.

Eusebius of Caesarea (263-339) brings to completion the work of harmonising the different eras which Christian chronology had worked out in terms of world history and human redemption. In the 2nd and 3rd centuries A.D., other attempts to achieve this had already been made by people like Clement of Alexandria, Sextus Julius Africanus and Hippolytus of Rome. In his *Chronicon*, Eusebius begins with Adam, and the various chronographies are set out in parallel columns. In the 5th century B.C., Hellanicus of Lesbos had already tried to formulate a unified chronography for various successions of events; Timaeus used the Olympiad cycle as a point of reference for dating, and it is on this work of Greek origin that Christian chronography is based, bringing together as it did into one great synopsis the events of both sacred and secular history. The chronicle of Eusebius, which was written about 300 A.D. and translated into Latin by Jerome, who also continued it up to 378 A.D., became the basic work of chronology for western Christendom. In 258, Bishop Anatolius of Laodicea had worked out an Easter cycle of nineteen years, which probably provided a basis for the era established by Sextus Julius

the new chronology
of Eusebius

Africanus (3rd century), and which reckoned 5501 years from the Creation to the coming of Christ; and it was in an attempt to reform this cycle that two other important cycles for the history of Byzantine chronology came into being. These are the cycle of Peter of Alexandria and that first used at Constantinople in 354. Archbishop Peter adapted the cycle of Anatolius by making the first year of his own cycle correspond to the ninth of that of Anatolius, which began in 303 and coincided with the twentieth year of the reign of Diocletian. Since there were exactly nineteen years between the beginning of the reign of Diocletian and the end of the nineteen-year cycle preceding the year 303 (the year 303 is thus the first year of the next cycle), he established the custom of counting the years from the beginning of the reign of Diocletian (284); and if one divided by 19 the number of years which had elapsed since his reign began, the remainder always gave the year in the current cycle and hence the date for Easter. That is how the *Era of Diocletian* (or "Era of the Martyrs") came into being; it was the principal era used in the Egyptian area and in Coptic circles.

the table of
Theophilus of Alexandria

The Easter table worked out by Theophilus of Alexandria at the end of the 4th century and dedicated to the emperor Theodosius I (379-394) was based on the cycle of Archbishop Peter, and in its turn, provided the basis for the *Alexandrian Era* which, in the version drawn up by the monk Annianus, computes 5492 years from the Creation to the birth of Christ, and begins the year on 25 March. The Alexandrian Era was also used in other parts of the Eastern Empire, especially in monastic circles (e.g. by Georgius Syncellus and Theophanes the Confessor); and a final example of it is attested as late as the 11th century in the Typicon of the monastery of the *Evergètis* in Constantinople. During the reign of the Arian emperor Constantius II (337-361), another important modification of Anatolius of Laodicea's nineteen-year cycle was carried out at Constantinople, perhaps by a chronologist named Andreas. This new cycle was put into operation in 353, and it provided the basis for what Grumel (1958) calls the *Protobyzantine Era*, which begins the year at the end of March and dates the Creation to 5509 B.C. This era was used, together with other dating systems, in the *Chronicon Paschale* (7th century) but, according to Grumel, it must not be confused with the real Byzantine Era. According to Beaucamp *et al.* (1979), the former does not depend on the latter; but Schwartz (1899, cols. 2460-77) thought that it did, and in his view the era used in the *Chronicon Paschale* is simply an attempt to move the beginning of the Byzantine era to 5508, which would mean that it had already been worked out in the 6th century.

computations
in the Byzantine area

In the Byzantine dating system (which lasted for more than eleven centuries), 5508 years were calculated to have elapsed between the Creation and the birth of Christ. This system was worked out in the closing decades of the 7th century, but it was only at the end of the 10th century that it succeeded in supplanting other established chronological systems in the Byzantine empire. For some centuries it had to compete with other calendars which had been worked out since the 3rd century A.D. in the territories of the eastern Mediterranean, or, in a few cases, with calendars that went back to Hellenistic times.

When the Arabs occupied the religious and cultural centres of the "Fertile

Crescent" one after another in the 7th century (Antioch in 636; Beirut and Jerusalem in 638; Alexandria finally conquered in 646), the chronological systems in use there had already spread to Constantinople and Byzantine Anatolia; and the fact that no single dating system held sway in the Byzantine empire until the 10th century, except for the use of indictions (see below) and the regnal year of the *basileus* (emperor), is reflected in chronicle usage.

The traditional Byzantine Era, in which the year began on 1 September and 5508 years were reckoned to have elapsed between the Creation and the birth of Christ, had certain obvious advantages over the eras mentioned above. It fitted in with the indictions, and avoided the clash between the natural computation (*katà phýsein*) and conventional computation (*katà thésin*) implicit in the nineteen-year cycle of Anatolius, which neither the Alexandrian Era nor that adopted in the *Chronicon Paschale* had succeeded in avoiding.

the traditional
Byzantine era

When Anatolius worked out his Easter cycle, he must have felt obliged to give it a natural basis, for he made it begin at the vernal equinox (which, in his view, occurred on 22 March). Nevertheless, he probably realised that it was impossible to make the first year of the cycle coincide with that of the Creation because, since the cycle was based on the computation of the epacts, it was not possible to place its beginning in a year when there were no epacts; for the Bible text tells us that the sun and the moon were created on the fourth day, and it was therefore necessary to wait for the end of the first year in order to calculate the difference between the course of the sun and that of the moon. This matter of biblical exegesis made it necessary to insert a precyclical year at the beginning of creation, and if such a year was included in subsequent computations, it gave them a conventional quality by adding one unit to what was required with a calculation carried out *katà phýsein*, that is to say, according to the first year of the cycle.

In the brief chronological treatise which Georgius Monachus wrote around the middle of the 7th century, this clash is avoided by using a natural computation only, and the Byzantine Era was thus brought into being. Georgius Monachus justifies both his elimination of the precyclical year, and the appropriateness of a computation *katà phýsein*, by maintaining that the sun and the moon had been created by God on the same day, but not with the same age, for on the Wednesday of creation the sun was in its fourth day (counting from the birth of the universe) and the moon in its fifteenth, since God could not have created it in an incomplete state (i.e. it was created as a full moon). In this way, the 11 days of lunar epact were preserved, and the difference between a natural and a conventional computation was eliminated. In later centuries, this solution to the problem must have seemed satisfactory, not least because it produced a perfect agreement between era, indiction, solar cycle, lunar cycle and leap years. This not only simplified computation, but also conformed with that image of cosmic harmony which, in Byzantine ideology, distinguished *Romania* from other political systems. For all these reasons, which were conducive to a greater practical and religious coherence, the Byzantine Era began to displace all the other world eras in the Mediterranean area from the 10th century onwards.

the treatise
of Georgius Monachus

According to Grumel, moreover, it is possible that from the moment of its inception until a later unspecified period, the Byzantine Era began in March rather than

September (as tradition was later to confirm), since the above-mentioned treatise of Georgius Monachus dates the creation of the world to Sunday 31 March in 5508 B.C. In any case, when a man of such considerable cultural background as Michael Psellus (1018-c.1078) wrote his *On the movement of time, the cycles of the sun and the moon with their eclipses, and the discovery of Easter*, he evidently did not consider the problem to be of great importance, for he maintained that while the world had been created in March, the years of its being were to be counted from September. This suggests that such a practice was already well established in the Eastern Empire.

The other two established dating systems, which computed the years in terms of indictions and the years of an emperor's reign, were not solely Byzantine, and are invaluable for identifying events in a convincing way (Cosentino and Palumbo 1989).

indiction cycles Historians date the introduction of indictions to the time of the emperor Diocletian (284-305). His fiscal reforms were based on the establishment of a close relationship between the crops a farmer was capable of producing and the quantity/quality of the cultivable land, and it was in relation to this that he proceeded to regularise the requisitioning of foodstuffs to feed the army, which had been going on in a haphazard way since the time of Trajan (98-117 A.D.). For these *indictiones extraordinariae*, see Jones (1973) and Heichelheim (1979). The word *indictio* (*epinémesis*) means fiscal "distribution" or "imposition", and the Byzantine terms *indiktos* and *indiktió* are based upon it. At the time of Diocletian, what was probably meant was the assessment of taxable property as carried out for the first time in Egypt in 287 or 297 and to be repeated at the end of each five-year period for updating purposes (Stein 1968).

In 313, during the reign of Constantine, this period was extended from five to fifteen years. The term "indiction" later lost its original fiscal sense, and came to be applied to the chronological reckoning of years on a fifteen-year scale, so that the years were counted from one to fifteen, and then returned to one at the beginning of each new cycle. The first example of a public deed with an indiction dating is a decree of Constantius II of 15 January 356, contained in the *Codex Theodosianus* (12.12.2). In 537, as we have already pointed out, Justinian made it obligatory to include the indiction year in all public deeds. Byzantine indictions began on 1 September, at least from the 5th century onwards; but elsewhere in medieval Europe the beginning of the year varied.

The Sienese indiction began on 8 September; the Bedan or Caesarean indiction, which was used principally in continental Europe and Italy, began on 24 September, though in the papal chancellery it was only adopted at the time of Urban II (1088-99). The most frequently used indiction from the 9th century onwards was the so-called Roman or Pontifical indiction (Grumel 1958), which began either on 25 December or, more frequently, on 1 January. This was the principal indiction used in the early Middle Ages.

regnal years In considering the dating system based on regnal years, it must be kept in mind that until the first half of the 6th century, documents of the Eastern Roman

Empire usually adopted the classical Roman dating system, which gave the names of the consuls in office, with or without the regnal year. In *Novella* 47 of 31 August 537, the emperor Justinian ordered that public deeds should always be dated with the regnal year, the consular year and the indiction. From the year 541 — the year in which Flavius Basilius Junior, the last consul in the *pars Occidentalis*, was elected — it became the practice to count the years that had elapsed since he was consul (the “post-consular” system). When the emperor Justin II (565-578) assumed the office of consul himself in 566, it became the practice to indicate his post-consular years after the regnal years. But it has to be remembered that he became consul for a second time in 568. After that date, the years may be expressed either by reference to his first or his second consulship (Tjäder 1955). As time passed, however, the consular computation of the years was abandoned in favour of the exclusive use of regnal years.

The days of the week were identified by adopting the Jewish custom of giving each day an ordinal number, beginning with Sunday. From the second century onwards, however, Sunday and Saturday were respectively given the names *kyriaké* (the day of the Lord) and *sábbaton* (from the Hebrew *sabbath* — the day of rest in the Jewish religion), but there are also cases of the word *próte* (“the first”) and *ebdóme* (“the seventh”) being used. The Byzantine calendar corresponds exactly to the Julian calendar, except in two matters: from the 6th century onwards it makes less and less use of the system of *kalendae*, *idus* and *nonae* for computing the days of the month, preferring to use ordinal numbers; and the year begins on 1 September, not 1 January. It must also be mentioned that up to the 9th century another type of calendar can be found alongside the Julian calendar, especially in chronicles. In most cases, the calendar concerned was the Macedonian calendar or a variation of it (see the *Chronicon Paschale* and the *Chronographia* of Theophanes), which had come into being in Egypt and subsequently spread through Syria and Asia Minor following the conquests of Alexander the Great (334-331 B.C.). There is a document called the *Hemerologium Florentinum*, dating to Roman times, which gives the calendars of certain cities and provinces in Asia Minor and compares them with the Roman calendar. Since that calendar is luni-solar, it corresponds only approximately to the Julian calendar.

Except as regards the use of weeks for measuring time, we can say that the Byzantine world in general adopted a system which was not very different from that used in the classical Roman world. In the Byzantine world, too, the parts of the day were identified by subdividing the *nychthémeron* (period of 24 hours), which began at sunrise. In the 5th century, the day began with the *hòra próte* (the first hour), which was at sunrise; this was followed by the *hòra tríte* (third hour) towards mid-morning, the *hòra hékte* (sixth hour) at midday, the *hòra enáte* (ninth hour), towards mid-afternoon, *hespéra* (evening), around sunset, and *apódeipnon* (*completorium*), after dinner. Unlike the Romans, the Byzantines apparently did not have a parallel system for subdividing the twelve hours of the night, though they did use the term *óρθρος*, corresponding to the Latin *matutinum*, to indicate the period before sunrise.

In the earliest periods, the Armenians used the chronological computations of the

nations to which they were politically subject, or whose political influence was paramount. Even the Armenian language did not acquire literary codification until the 4th and 5th centuries A.D.; in Armenian circles, the earlier tradition was to write chronicles and annals in Syriac or Greek, and they do not seem to have adhered to a chronological system related to a calendar. As soon as Armenia was christianised, the computations of Eusebius of Caesarea were adopted, using a complex system of royal and patriarchal genealogies.

It was the need to establish the dates of Christian religious festivals (especially Easter) which ensured that a fixed calendar was adopted. At first it seems likely that the Byzantine calendar was used; later on, because Armenia became detached from the Greek world in a religious and political sense, the "great" Armenian era was introduced. Its beginning was set at the end of the two hundred-year canon of Andreas, which had been worked out in Byzantium for the years 353-552 (but we know this calendar only from Armenian sources). Zoroastrian Persia had an influence on the development of the new calendar, which consisted of twelve thirty-day months arranged in the following order: Nawasardi, Hori, Sahmi, Trē, K'aloc', Arac', Mehekani, Areg, Ahekani, Mareri, Margac', Hrotic'. To the 360 days contained in these months were added five epagomenal days (*awelead*), in accordance with traditional Persian and Egyptian usage. The era began on 1 Nawasardi in year 1, which corresponded to 11 August 553.

This "great" Armenian calendar was not adopted immediately. It gradually gained ground towards the end of the 6th century, and there were various attempts to modify it. Unlike the Egyptians, in fact, the Armenians did not observe the custom of adding a sixth epagomenal day every four years, with the result that their calendar had a vague year, which was out of phase with the Julian calendar by one day every four years. The adoption of a 365-day cycle (i.e. one which was out of phase with the solar year by six hours every year) was always a problem, especially as regards the dates when religious feasts were to be held, as prescribed by the menologists.

The "great" era was used by all Armenians until the 12th century, when the Julian calendar was introduced by John the Deacon, at the time of the patriarch (kat'olikos) Grigor III Pahlavuni, the new era beginning with the year 1085. However, it was principally in northern Armenia that this "little" era caught on. Many historiographers and chroniclers, at any rate, made the problem more complicated by using their own chronographical computations. And the situation was made worse by the fact that the beginning of the Armenian year coincided with the Christian feast of Epiphany. Indeed, some historians have suggested that the Armenians had a "double cycle", with "technical" computation on the one hand and "historiographical" computation on the other; but the fact is that any discrepancies can be attributed to individual historiographers.

In order to work out the year of the Christian era in which a year of the Armenian "great" era begins, add 551 to the Armenian year up to the year 769 inclusive. Thus 1 Nawasardi 769 corresponds to 1 January 1320. From the Armenian year 770 (which begins on 31 December 1320) onwards, add 550.

Syriac sources date events according to the Seleucid Era, which took its name from

king Seleucus I Nicator. When he took the title of “king of Babylonia” in 309/308 B.C., Seleucus abandoned the chronology based on the regnal years of Alexander IV (the son of Alexander III the Great and Roxana) to adopt a chronology following his own regnal years, but he antedated his accession to the throne and fixed it in 311, on the first day of the year according to the Babylonian lunar calendar, i.e. 1 Nisan (in that year = 3 April). Later, when he was also recognised by the Greeks as “basileus”, he put back the beginning of his chronology to 312, starting to count from the beginning of the Macedonian year, in the autumn, on the first day of the Macedonian month Dios. Macedonian names were assigned to the Babylonian months, so that there was one calendar and two slightly different era systems (the Babylonian system for Chaldea and the Macedonian system for Syria and Asia Minor).

As in all territories conquered by the Romans, the Babylonian lunar calendar was superseded by the Julian solar calendar. Here, too, Babylonian and Macedonian names were simply assigned to the Julian months. This reform gave birth to the chronological system that was to be found in the texts of the Christian period.

In practice, there are two ways of transforming a Seleucid year into a Christian year: if the date is between 1 October and 31 December, subtract 312; between 1 January and 30 September, subtract 311. The month correspondances are as follows: Hyperberetaeus = Tishrin I = October; Dios = Tishrin II = November; Apellaeus = Canun I = December; Audynaesus = Canun II = January; Peritius = Shebat = February; Dystrus = Adar = March; Xanthicus = Nisan = April; Artemisius = Iyyar = May; Daesius = Haziran = June; Panemus = Tammuz = July; Loüs = Ab = August; Gorpiaeus = Elul = September.

The base date chosen in Arab culture for the computation of the years in their calendar is 16 July 622, which is the day of the Hegira (“emigration”) and was called the first day of Muharram in year 1. On the basis of astronomical calculations, however, that day is 15 July. The Muslim year consists of twelve lunar months, each containing 29 or 30 days. Their names are as follows: Muharram, Safar, Rabi al-Awwal, Rabi ath-Thani, Jumada-l-Ula, Jumada-th-Thaniyya, Rajab, Sha’ban, Ramadan, Shawwal, Dhu-l-Qa’dah, Dhu-l-Hijjah.

To express a date from the Muslim calendar in terms of the Gregorian calendar, therefore, it is not sufficient to carry out a scaling operation or add 622; for we have to take into consideration the fact that the lunar year is 11 days shorter than the solar year. This means that the number of the Muslim year must be multiplied by that difference, that is to say by 0.97, and then 622 must be added. Similarly, to express a Gregorian year in Muslim terms, subtract 622 and divide by 0.97. There is also a formula, worked out by Millosevich in 1913, for expressing the relationship between the Muslim calendar and the Gregorian or Julian calendar:

$$H = G - 622 + \frac{G - 622}{32} \quad G = H - \frac{H + 622}{33}$$

These calculations, however, obviously do not solve all the problems of relating the Muslim and Gregorian chronological systems, because the fact that the months are not of equal length means that, in terms of the solar calendar, the relationship of months and days is always changing. Therefore, in order to find out the exact day

and month on which a particular year begins and ends, it is necessary to consult the appropriate chronological tables (Cattenoz 1954).

Earthquake theories

reason and the sacred
in the observation of nature

We have already pointed out that it is difficult to accept as scientific data records of earthquakes from "mythological" times, or at any rate those which make only a vague and indistinct appearance in historical records. Such data, we have said, may be unusable for such "factual" purposes as a catalogue, but are nevertheless deserving of study. In a more general way, in fact, we can say that comprehensive religious and naturalistic theories about earthquakes in the ancient world (which the positivists separated out in their attempt to identify and utilise only those data which they held to be "rational", but which in fact were never neatly separable from the rest) are the result of an exceptional preoccupation with the dynamic qualities of the inhabited environment and the geomorphological changes which it underwent (see below: *Earthquakes in Greek and Roman myth*, pp.94-100).

The ancient world bequeathed to us an awareness of seismic geography, which was the fruit of observations, comparisons, and recollections of actual occurrences, first handed down and fixed in oral culture and later in written learning. It was this written learning which was absorbed, popularised and transformed by those peoples who lived, mingled and clashed with one another in the Mediterranean basin.

Since ancient records of earthquakes were conditioned by the cognitive situation of the time; and since there are frequent specific references to earthquakes in ancient treatises, we have been obliged to take due account of both religious and naturalistic interpretations in classical and later times.

Natural philosophy

Even a brief review of earthquake theories necessitates tracing their principal developments in ancient and medieval philosophy. For seismic phenomena attracted the attention of many Greek philosophers, as well as Latin and Arab naturalists. This brief review will refer to what has already been set out in the Italian edition of the catalogue and to Marmo (1989 a and c) as regards both the ancient and medieval worlds. Substantial extracts from these works are provided here, and we suggest that the reader consults the works themselves for complete bibliographical references.

Our knowledge of the various theories elaborated in the ancient world about the causes of earthquakes comes to us through Aristotle, Pliny the Elder and Seneca. Thales The earliest theory is attributed by Seneca (*NQ* 6.6.1) to Thales (c.624-c.545 B.C.), whom Aristotle identified as the initiator of philosophical enquiry into the principles of nature. The cause of earthquakes lies in the principle (or material cause, to use Aristotle's terminology in *Metaphysics* 1.3.983b) of all things, namely water or the humid element, on which the earth floats like a vast ship. This theory is supported by the observation that new springs gush from the earth when it is struck by an earthquake — a phenomenon which is also explained by comparison with a ship, which takes in water when it rolls (Sen. *NQ* 6.6.2; see Marmo 1989 a). Closely linked to Thales' theory, at least from a thematic point of view, is that

which explains earthquakes as deriving from the spontaneous movement of subterranean water: rivers on the earth swell, flood and violently wash away everything they encounter, and the waters which lie in great basins under the earth behave similarly (Sen. NQ 6.6-8). Democritus (second half of the 5th century BC.), as reported by Aristotle, adopted a similar position. The earth is full of water, and when it receives an excessive extra quantity after torrential rain, it moves; and the mass of water which the earth is no longer able to retain, bursts out and so produces earthquakes. Democritus

Although Anaximenes (586-528 BC.) seems to accept the general import of Thales' ideas, he apparently differs, as reported by Aristotle (*Metaphysics* 1.3.984a), in not finding the cause of earthquakes in a first principle of corporeal elements which is prior to water (see Marmo 1989 a). He prefers to tackle the problem in terms of efficient cause: even if air (or water) is the prime element of things or, to use the metaphor of the ship, what they rest upon, once things in the world have taken their being, they have an autonomous existence. In this context, his choice of simile to illustrate how earthquakes are produced is significant: the earth is like an old house in which the lower parts suddenly give way, thereby undermining the upper parts or causing them to collapse (Sen. NQ 6.10.2). Seneca's image fits Aristotle's theory: it is the internal workings of the earth, subject as they are not only to ageing but also to a lack or excess of water, which produce shaking at the earth's surface. Anaximenes

Aristotle and Seneca seem to disagree about Anaxagoras (5th century BC.) as well as Democritus. Aristotle attributes to Anaxagoras the theory that earthquakes occur when the ether, which has a natural tendency to rise, is imprisoned in subterranean cavities and cannot escape because the earth's pores are blocked by rain. Aristotle rejects this explanation as over-simplistic, because it assumes that the earth is a flat object floating on ether, and especially because it does not account for the particular circumstances (time and place) in which earthquakes mostly occur (*Meteorologica* 2.7.365a). As Marmo (1989 a) points out, however, Seneca sees Anaxagoras' theory as an attempt to provide a unified explanation of both celestial and subterranean phenomena in terms of the action of fire (NQ 6.9.1). But ether was itself considered to be a "fiery" substance, and Seneca himself defines it as such in another passage in the *Naturales quaestiones* (6.16.2: *igneus aether*). Anaxagoras

Seneca goes on to mention other natural philosophers who, like Anaxagoras, took the view that combustion within the earth caused collapses and hence cracks in the earth's crust (6.9.3).

This theory and that involving subterranean water are probably also linked to another which saw the prime cause of earthquakes as the action of "subterranean vapours" released by water under the earth. The analogy used to illustrate this theory is quite original as compared to what we have so far encountered, and closely echoes those used in medical treatises. It too gives the impression of being an experiment which somehow places before our eyes something which cannot be observed, whether it is the functioning of the human body or the behaviour of the elements contained within the earth. The metaphor adopted is that of water boiling in a small pan on the fire.

A number of theories, with just slight differences between them, explained seismic

phenomena in terms of force exerted by air (*pneuma*).

Diogenes of Apollonia

The philosopher Diogenes of Apollonia (5th century B.C.), a contemporary of Anaxagoras, was the first to put forward this theory. Aristotle associates it with Anaximenes, whose disciple he was, according to Diogenes Laertius (9.9.57), as the proponent of the doctrine that air was the first principle of things (*Metaphysics* 1.3.984a). Where he apparently parted company with his teacher was in making air responsible for earthquakes. Air penetrates into the bowels of the earth through the pores which either appear in its surface naturally or are created by the erosive action of rivers and tides. But when the pores are blocked, the air finds that its exit is barred and begins to move violently. Since it cannot follow its natural movement, which is rectilinear (*in rectum*), it turns upwards (*in sublime*) and shakes the earth (Sen. NQ 6.15.1).

Although Diogenes of Apollonia (or rather Seneca in reporting him) does not clarify the nature of the *spiritus* whose thrust succeeds in shaking the earth, it seems clear that the prime element in this case is not the air but rather its most natural manifestation — the wind. It is Archelaus (5th-4th century B.C.) however — the presumed teacher of Socrates and pupil of Anaxagoras — who specifies that the wind is responsible for earthquakes (Sen. NQ 6.12.1-2).

Archelaus

Aristotle

Aristotle's view is that winds and earthquakes have common elements. In his *Meteorologica*, he deals with earthquakes immediately after winds precisely because they have the same kind of cause (Oeser 1992). According to Aristotle (*ibid.* 2.4), there are two types of exhalation: one is damp and is called vapour, while the other is dry and has no specific name but is commonly called by the name of a subspecies, "smoky exhalation" (2.4.359b). The latter is the origin and natural substance of the wind (2.4.360a), which is therefore more than just air in movement. This dry exhalation, called *pneuma*, is the common factor in earthquakes and winds. Thus when the earth is warmed by the sun and its own internal fire, it produces a large quantity of *pneuma*, both internally and externally. When the *pneuma* comes out of the earth it gives rise to winds; but when it travels downwards into the earth, it collects and causes earthquakes (2.8.365b). The relationship between the damp and dry exhalations of the earth also explains the climatic conditions in which, according to Aristotle, earthquakes usually occur: at night and at midday, because of the absence of wind and exhalations (2.8.366a); and in spring and autumn, because they are times of heavy rain and drought. As Marmo (1989 a) points out, Aristotle also refers to a quite important part of medical theory, offering it — though with some caution — as an analogy in the search for the hidden causes of natural phenomena.

Theophrastus
and Strato of Lampsacus

Theophrastus (373/370-287 B.C.) and Strato of Lampsacus (328-270/278 B.C.) developed certain aspects of Aristotle's theory. Theophrastus adds subterranean collapses to *pneuma* as causes of earthquakes; while Strato of Lampsacus brings in the dynamic relationship between *pneuma* and heat and cold, whose continually changing state in the bowels of the earth accounts for the movement of the *pneuma* and its action at the earth's surface (Sen. NQ 6.15.2-6).

In the *De mundo*, a work which some scholars attribute to Aristotle, four types of earthquake are listed: they may be tilting, shaking, collapsing or splitting. To these are added further subtypes, divided according to accompanying phenomena

(the emission of blasts of wind, stones or mud, or subterranean noises), or on the basis of the number and type of shocks (those which involve a single shock are called *strike earthquakes*, and those which produce oscillations in opposite directions are described as *vibrational*).

The early Stoa (3rd-2nd century B.C.) left no contributions on the subject. Their general attitude, however, can be deduced from the reworking of the *pneuma* theory by Posidonius (135-51/50 B.C.). Like Chrysippus (281/277-208/204 B.C.) Posidonius thinks that the world is a living, rational and animate being (Diog. Laert. 7.1.142). This view gives even greater significance to the use of the analogy with the functioning of the human body.

Chrysippus
and Posidonius

Posidonius, too, provides a classification of earthquakes. They are “undulatory, catastrophic, whirling or shaking” (Diog. Laert. 7.1.154). Closely connected to the Stoic view is the theory of vital breath which, according to Seneca, was “accepted by many writers” (Sen. *NQ* 6.16.1).

Then there are the theories which we can describe as “pluralist”. Democritus had thought that wind and water in subterranean cavities acted in the same kind of way. The same dynamics applied to both fluids (compression, search for a way out and outburst), though sometimes it was the wind which pushed the water (Sen. *NQ* 6.20.1-4). Aristotle used this very case to construct an argument against that part of the theory of Democritus concerning the motive action of water, maintaining that the *pneuma* is the motive force, just as it is the wind which produces waves and not the reverse (*Meteorologica* 2.8.368a).

According to Epicurus (341-270 B.C.), an earthquake can be produced by all the causes mentioned (which are reducible, in accordance with the scheme of things set out in Seneca’s work, to the four original elements: water, earth, fire and air), and by others as well. He criticises all those who have done no more than indicate a single cause (Sen. *NQ* 6.20.5), the reason for his attitude being that the causes of earthquakes belong to a category of objects — those which are “obscure of their own nature” — which can only be known by inference or conjecture based on signs. We can read these assertions by Epicurus as an invitation both to construct explanatory models by means of the systematic use of analogy deriving from what is perceived by the senses, and to recognise the profound moral motivation underlying his choice of methodology: the plurality of explanations for phenomena which go beyond our understanding of nature, helps to preserve the unperturbed tranquillity of mind which is the ideal state for the man of learning.

Epicurus

Roman culture inherited a great deal from the classical Greek world, and took over ancient thinking about earthquakes almost without modification. Lucretius (98-54 B.C.) in his *De rerum natura*, Seneca (4 B.C.-65 A.D.) in his *Naturales quaestiones* and Pliny the Elder in his *Naturalis historia* are the principal cultural links through which classical earthquake theories have come down to us. They did not work out new theories but described traditional interpretations, often adding descriptions of geodynamic phenomena of their own day (earthquakes, the emergence of islands, volcanic eruptions etc.). Sometimes these phenomena provided a stimulus for a written work. Thus Seneca’s chapter on earthquakes in the *Naturales quaestiones* was written after the earthquake of 62 A.D. in Campania which caused serious damage at Pompeii and Herculaneum.

Lucretius

Seneca

As far as Western thought is concerned, it is worth noting a passage on earthquakes by that great heir of ancient learning, Isidore of Seville (560-636) — one of the earliest and most famous medieval encyclopaedists. As Marmo (1989 c) points out, Isidore only makes a few parenthetical remarks about earthquakes in his *Etymologiae*, mentioning the opinions of Sallust, Lucretius and other authors whom he does not identify. Though his comments are expressed in general terms, they contain clear traces of classical explanations of earthquakes, ranging from the theory which identified water as the cause of earth tremors, first formulated by Thales and later taken up by Lucretius (6.555), to the wind theory, first worked out by Democritus and then by Aristotle (*Meteorologica* 1.2), and the theory of the collapse of subterranean caves propounded by Theophrastus.

Isidore's attitude in the *De natura rerum liber* is different, however. His preference here is for Aristotle's theory. In this second work, the fundamental clash is rather between worldly learning, which provides a causal and rational explanation of these phenomena, and scriptural learning, which interprets events on earth as signs of an otherwise inscrutable divine will. Isidore seems to be trying to consider the opposed theories of internal collapses and subterranean water movements as corollaries of the theory of trapped winds (46.2, p.76). Certainly, internal collapses and subterranean water movements could both be conceived as a consequence of the movement of winds, which was capable of producing earthquakes by itself. The opinion explicitly adopted by Isidore has attached to it a small appendix of an apparently "observational" kind, which serves to confirm the theory itself: "Earthquakes frequently occur where there are cavities in the ground, winds entering into them and provoking the earthquake; and indeed, where the earth is sandy or solid, there are no earthquakes" (46.3, pp.76-7).

The other aspect of Isidore's — and what is effectively the medieval — view of earthquakes is that which takes its inspiration from the Scriptures, and finds the most appropriate allegorical interpretation in the theory of the winds. The wind which blows violently from the bowels of the earth is a symbol of the spirit of God which will come to judge the world at the end of time.

Marmo (1989 c) points out that although an earthquake appears in the *Revelation* of John amongst the consequences of the breaking of the sixth seal (6.12), Isidore does not interpret it as a warning sign of the imminent end of the world, but only as a "figurative anticipation".

About a century later, the Venerable Bede (672-c.735) returns to the subject in his *De natura rerum liber*. In effect he repeats the theory of the winds, presenting it in the same form as Isidore; but he adds a new element by drawing a parallel between the production of earthquakes and that of thunder and sea floods (cols.275-6). It is interesting to note that his interpretation of the sixth seal in the *Revelation* of John excludes the theoretical possibility of any historical event at all being interpreted as a sign of the end of the world (see Marmo 1989 c). This observation is confirmed by a number of other sources, and it allows us to note that medieval Latin thought, at least in its most elevated expression, made a distinction between naturalistic and allegorical thought, thus displaying a rational awareness of the way language could be used (Guidoboni *et al.* 1992). It is only at a lower level of learning (as sometimes expressed in monastic annals) that a historical seismic

event can be elevated to the role of explicit “sign” of a supernatural reality. At the more speculative levels of learning, matters were seen differently. But these are questions which fall outside the nucleus of naturalistic theory, and are rather to be seen as descriptive of a moral and religious consciousness of events.

The theory of earthquakes in Aristotle’s *Meteorologica* was known in the later Latin Middle Ages through Persian and especially Arabic translations — that is to say through the texts of Avicenna (Ibn Sina, 980-1037). Although the first three books of the *Meteorologica* had been translated into Latin (by Gherardo of Cremona in the 12th century and Michael Scot in 1217-20), it was the Arab commentary which influenced the great medieval scholar Albertus Magnus (1206-1280). In his *De mineralibus et rebus metallicis*, written about 1260, he takes up the theory of Avicenna, according to whom volcanic activity was evidence of the existence of winds imprisoned in the bowels of the earth. It should be noted, incidentally, that Arab natural philosophy did not “invent” new interpretative theories about earthquakes, but rather added empirical observations to support them. This was the way theoretical progress was made in those days, and “inventions” — which were generally improvements to already well-known theories — never took the form of “revolutions”. The medieval view of geology was fairly complex and largely based on Albertus Magnus’ elaboration of Avicenna’s translations of Aristotle. Avicenna’s *De mineralibus* thus plays an important part in medieval natural philosophy, for what Albertus Magnus drew from Avicenna’s translation of Aristotle, taken as a whole, was the basis of western “geological” thought until the close of the 15th century (Walzer 1962).

Arabic translations
of Aristotle

Religious thought

Naturalistic interpretations of earthquakes are not to be taken as examples of “rational” thought, in contrast to those other interpretations which had their origin in the religious mentality which, we must always remember, was a fundamental aspect of all ancient and medieval culture.

In spite of our unwillingness to consider such beliefs as an adjunct of naturalistic observations, we really cannot ignore them, especially if we keep in mind that they persisted up to the 18th century. The fact is that the religious tradition concerning great seismic events in the Mediterranean basin goes back more than three, and perhaps four, millennia: linguistic traces and dialectal substrata can be found in place names, and they are the material of myths and lore which was gathered and written down much later. Such traces are part and parcel of the memories lodged in culture, where they are therefore reflected, transformed and interpreted, because destructive earthquakes were important events occurring in geographical regions that were widely inhabited.

In their attempt to “bind together” dynamic terrestrial phenomena in a unitary vision of the cosmos, the major religious theories worked out a comforting, magical and exorcising interpretation of earthquakes, in which the gods defy one another or interact with human behaviour by punishing or intervening — sending down, in other words, clear signals of their immense power.

We have already pointed out that the way the sources expressed themselves was conditioned by their interpretation of earthquakes as prodigies. Even though in ancient times certain dates had already acquired epoch-making significance and

historical contexts

hence ensured the survival in history of particular earthquakes (e.g. the one at Sparta c.464 B.C.), we cannot in fact separate the rational aspect of ancient attitudes to earthquakes from the magical and religious beliefs which are associated with the most archaic reports and continued to develop subsequently. The ancients, furthermore, kept alive the memory of disasters which had occurred in very early times, as in the famous case of Santorini. An interesting phenomenon is the recording of prehistoric disasters, which 19th century catalogues vainly tried to date (see Traina 1989 a, p.106). This is often a case of an *a posteriori* rationalisation of myths connected with the earliest strata of a tradition. There are many such cases in the sources, the most striking being that of Plato and Atlantis, but writers such as Strabo or Pliny the Elder provide many more examples, concerning the appearance of islands, rock fissures and subsidence.

gods and giants

In the earliest magical and religious cosmologies, earthquakes were an item of great interest. Real or supposed natural phenomena were attributed to divinities such as Poseidon or Zeus, or to mythological figures such as the Giants, or even to human heroes and holy men; and the tradition was to lead right up to the legends of the Christian saints. In ancient Greece, the phrase "the god shook..." was used to indicate an earthquake in exactly the same way as "divine wrath" in later Byzantine chronicles.

"holy men" and
earthquake prediction

In archaic times, the observation and forecasting of earthquakes was the province of men usually defined as "philosophers", which is to say natural philosophers. These men, however, often played the role of "holy men", and as such tried to predict disasters: a famous example is that of Pherecydes of Syros (6th century B.C.), the teacher of Pythagoras, who predicted an earthquake three days before it actually occurred, after drinking water drawn from a well (Diog. Laert. 10). The Ionic thinkers of the 6th and 5th centuries B.C. were, as we have seen, busy carrying out a process of rationalisation, and they were also recorded as making responses and predictions about earthquakes.

An interesting case is that of the island of Delos, which was thought to be "pure" and therefore immune from earthquakes. In accordance with this belief, the ancients recorded the 'first' earthquake at Delos under different dates (490 and 431 B.C.). Until the 4th century B.C., at any rate, earthquakes were recorded in terms of their magical or religious significance; and that tradition continued to exist even later.

the spears of Mars

A religion that was as traditional by nature as that of Rome, attributed some importance to prodigies. As we have seen, they were drawn up each year in lists, which were sometimes of considerable length, their contents depending on the seriousness of the current situation. An interesting example of this kind of record is the phenomenon of the spears of Mars (Palumbo 1989 a). Amongst the prodigies related to earthquakes which Roman historians often listed in their narratives, one of the most frequent is the movement of the spears of Mars. As far as we know, they were not preserved solely in Rome, and were not only an attribute of Mars (Livy 21.62.4, mentions a spear of Juno at Lanuvium). Of particular interest, however, are the spears preserved in the *Regia*, because the interpretation of a passage in Aulus Gellius by Lanciani (1918) complicated research by those who, at that time, were trying to catalogue earthquakes which had struck Rome.

In relation to the year 99 B.C., Gellius writes (4.6) that if the spears of Mars in the *Regia* moved, the matter was reported to the senate. On one such occasion, the senate issued a decree (which Gellius transcribes) ordering the consul to make sacrifices to Jupiter and Mars and such other gods as he thought fit.

There is a certain imprecision about the decree of the senate which Gellius transcribed and which established which gods are to be sacrificed to; for while Jupiter and Mars are specified, the consul is left to choose the other gods to whom expiation shall be made. It is Mars rather than Jupiter, however, who gains our attention. According to Lanciani (1918), we can deduce from this passage that the spears were arranged in such a way as to act as a kind of rudimentary seismic

rudimentary seismic
"warning devices"?

warning device, for it was seismic shocks which caused them to shake. And an attempt has recently been made to associate with the spontaneous movement of the spears, that of the sacred shields, called *ancilia*, which were also kept in the *Regia*. Their movement, too, could hence be seen as related to earthquake shocks (Bloch 1984, p.102). As far as the *ancilia* are concerned, there is no evidence to support the above suggestion and it has to be regarded as pure fantasy. The context within which the movement of the spears is recorded, however, suggests certain specific circumstances: it is stated that the movement occurs *sponte*, which implies that no outside agent did anything to alter the state of rest of the spears (Dumézil 1977, p.38). Gellius is in fact probably identifying two separate prodigies: the earthquake and the movement of the spears of Mars; but a link between the two phenomena is at least a possibility, and hence the hypothesis that the spears moved because of an earthquake cannot be completely rejected. The movement may indeed have occurred, but it is obviously very difficult to believe that something had been set up in the *Regia* specifically to register earthquake shocks, as Lanciani seems to have supposed. We therefore cannot tell how reasonable it is to accept that the movement of the spears in the *Regia* was the effect of a seismic phenomenon, whether local or distant. What we can conclude, however, is that when the spears shook as a result of an earthquake which was recognised as such, the phenomenon will not have been recorded. For it was the job of the priests to decide when the shaking occurred "spontaneously" — that is to say when the shaking (the usual cause of which was presumably an earthquake) was not identified as a seismic effect. However that may be, this does at least demonstrate that while quite destructive earthquakes could be ignored, notice might be taken of minor phenomena, such as those affecting the spears of Mars. At least as regards Italy at the time of republican Rome, therefore, the data provided in Nissen's list (1883) cannot be taken to indicate which seismic phenomena were the most severe. While the selection made in prodigy lists is not a random one, it reflects a different type of logic from that which modern scholars seek in an earthquake list.

The decline of these religious practices, as we have seen, was accompanied by a decline in the information about earthquakes in Italy recorded in imperial and late antique times.

Towards the end of antiquity, the two interpretations of earthquakes often seem to come together at the frontier between empirical observations and religious ideas, as is the case with astrology. As early an author as Pausanias (2nd century A.D.) seems to ignore previous writers of a rationalistic tendency, attributing earth-

empirical practice
and religious ideas

quake effects to Poseidon, as did the earliest tradition. Earthquakes seem, at any rate, to belong to that group of disturbing phenomena which led to what has been described as the late antique "age of anxiety". They thus became a threat to public order, and had to be confronted with an increasingly solemn image of imperial power, to which was attached, after Constantine, the additional seal of the "true faith".

the Christian view As far as natural phenomena are concerned, there was no clear break between the culture of the ancient world and that of Christianity. The latter seems simply to have effected a transformation of content and expectations, in some cases doing little more than superimpose new values on those handed down from the classical world. Amongst the new values was the affirmation of the idea — originating in the Bible — that nature was created for man, and that man therefore held sway over nature. This introduced a substantially optimistic view of the world's purpose, based as it was on the idea that creation was fundamentally inexhaustible. As time went on, this led, in western Christian culture, to an unwillingness to reflect on the interaction between natural phenomena and human society, except in an eschatological way.

The Christian religion saw earthquakes as a sign of the divine presence over and above the laws of nature: the manifestation of a superior will which shakes the earth in order to convey a reprimand for moral and religious transgressions. In Christian culture this view of earthquakes has coexisted and become entwined with naturalistic theories, with results that are sometimes surprising. Its roots lie deep in the Christian tradition of Holy Scripture; and it is possible to identify the period during which it held authority, outlawing other ways of thinking and establishing itself as the only view possible.

the natural origin of earthquakes as a heresy In the *Liber de haeresibus*, written between 383 and 391 by Philastrius, bishop of Brescia (he died between 391 and 397), the belief that earthquakes have a natural origin is listed as a heresy, on the grounds that it is a negation of the power of God and a product of pagan culture. This is clearly an early "twig" from those "tangled branches of historical confusion" (*indigestae historiae inestricabilem cratem*) which Orosius dealt with later on (*Historiae adversus paganos* 3.2.9).

There are 156 heresies listed in Philastrius' book, the one about earthquakes being 102. This substantial list almost doubled the number of heresies listed by Epiphanius; and it is suggested that both of them used the *Syntagma* of Hippolytus as a work of reference. Although of little value, Philastrius' work achieved a certain reputation: Gaudentius and Augustine both used it. The latter probably learned of it from Ambrose, who owned a copy and was therefore able to use it for his own *Liber de haeresibus*.

The passage on heresy 102 reads as follows: "It is a heresy to believe that earthquakes are not produced by the will and indignation of God but by the very nature of the elements, ignoring what the Scriptures say [...]. They pay no attention to

The personification of earthquakes as Atlas, in a 9th century psalter. Atlas adopts a variety of positions as he supports a cave which is in the process of collapsing.

The ancient world provided Christian culture with a number of mythical images of earthquakes (Utrecht, Bibliotheek der Rijksuniversiteit, Salterium, ff.48v and 57v).

the power of God, but dare to attribute the movement of the elements to the power of nature, like certain futile philosophers who attributed [earthquakes] to the nature of things and failed to recognise the power of God. For this is one of the ways in which the indignation and power of God works in things and strikes his creatures for the conversion and benefit of many sinners" (PL 12, col.1216).

The religious view of the origin of earthquakes — which acquires such theological and doctrinal rigidity in Philastrius — coexisted with the naturalistic theory over a long period; and the fact that both the religious view (even when it had lost its rigid formulation) and the naturalistic view existed at the same time in the same cultural context, led to the opinion that there were two kinds of earthquake: the natural and the non-natural.

traces of the long conflict between faith and reason

But this "double theory" — which leads, as we have pointed out, to the abuse of the term "catastrophe" as applied to earthquakes — also occurs in famous earlier works written by court doctors and physicists, who were proponents of "culture" and in one way or another influenced the common scientific thought of their time up to the end of the 16th century. While this is not the appropriate place for a discussion of the interpretation of earthquakes in the later Middle Ages and early modern times, we may perhaps be allowed to offer a few examples of this long opposition between faith and reason, in order to seek to understand the complexity of naturalistic thought at a time when its frontier with theology had not yet been established. In his *Dialogo del terremoto* (1571), Jacopo Antonio Buoni deals explicitly with the subject: *Whether earthquakes are natural or prodigious* (Para.325) and *The opinion of St.Thomas as to whether earthquakes are natural or miraculous* (Para.327). The problem is solved by accepting the scale of values which had already been clearly codified in Thomist philosophy: God is the prime cause and matter the secondary cause. It is interesting to note in this connection that Philastrius and his heresy 102 are mentioned as being at the historical root of the problem. Though philosophical solutions to the problem were not always as clear as this one, considerable success was enjoyed throughout the 16th century by works which presented earthquakes as sometimes having natural and sometimes supernatural causes, and went on to discuss that particular problem.

natural and supernatural earthquakes in modern times

At the beginning of modern times, and for some centuries to come in minor works, writers wrestled with the question of the origin of earthquakes. Their thinking was complicated by the many theological considerations involved, as well as by the



feeling that nature was here intertwined with an ethical conception of the way things happened. The heresy about the natural origin of earthquakes was a marginal doctrinal codification by comparison with the great philosophical problems of pre-modern naturalistic thought, but it was a symbol of that all-embracing religious view of things which left substantial traces in the process of rationalising seismic phenomena. That there were non-natural earthquakes is explicitly stated in naturalistic treatises — and not only in minor works, where this view persisted throughout the 18th century: one example being an essay on the earthquake at Jerusalem in 363 A.D., during the reign of Julian the Apostate, by Warburton (1750), who considered it the most outstanding case of a non-natural seismic event.

the supremacy
of the sacred

In the early Latin Middle Ages, it was the religious view which held sway over the naturalistic theory. The importance of the supernatural element in human destiny as compared with earthly events, gave special emphasis to man's moral duty towards God, to the considerable detriment of solidarity amongst men. Hence early medieval Latin sources rarely record ordinary people, with all their fears and erratic behaviour, as victims of earthquakes, though that does happen in ancient and later Eastern sources. The latter quite commonly express sympathy for the human condition and describe the great suffering and desperation caused by seismic disasters which obliterated human lives and destroyed numerous buildings (miscarriages caused by fear during earthquakes are recorded almost as a symbol of the suffering involved, to the extent that they later became a literary stereotype).

the Byzantine liturgy

Byzantine religious culture, with its wealth of signs and symbols, was the direct heir of oriental tradition, and it linked earthquakes to the presence of God, seeing them as a divine *parousia*, freeing them from their negative association with death, and transforming them into a metaphor of nature bowing before its creator, or defining them, within this general religious view of things, as a "moral medicine" for sinful humanity, to adopt the expression used in the 6th century by Romanos Melodos. As Fioriti (1989) points out, what is peculiar to the Byzantine experience is that it causes the Church not so much to commemorate earthquakes as historical events, but rather to transfigure them. Earthquakes thus become an eschatological symbol of *parousia*, in which absolute truths and the nature of God are revealed. The earthquake becomes "an early announcement of a definitive future, which cannot be ignored because, like every act of God, it is unique and unrepeatable" Fioriti (1989, p.194). Fioriti points out that of the 49 troparia in the menaion used in the Byzantine religious celebration of earthquakes, almost all come from the canon *At times of danger from earthquakes* by John the Hymnographer. According to Fioriti, what is peculiar to the Byzantine liturgy as regards earthquakes, is that while the Roman and Latin liturgies take a negative view of seismic phenomena, seeing them as a deserved divine punishment, the Byzantine liturgy links earthquakes to the paschal mystery, which is seen as "central to the history of salvation" Fioriti (1989, p.191). This gives us some idea of why the symbolic significance of earthquakes in the Byzantine liturgy takes on a celebratory and epiphanic aspect, which transfigures this devastating terrestrial phenomenon, because it provides a moment of contact with God.

The “liturgical” interpretation of earthquakes was not confined to Constantinople; and liturgical texts are not solely of value to the history of religious thought. In at least one case — that of the *Typikon* of the monastery of San Salvatore at Messina (Sicily) — there is evidence of a local earthquake. This 12th century manuscript records the arrangement of religious services to be held throughout the year (for fixed as well as movable feasts), and the rubric for 31 August prescribes the commemoration of an earthquake. Since the date of the earthquake does not correspond to that of any of the major earthquake commemorations prescribed in the *Typikon* of the Great Church at Constantinople, it seems to us very likely that the Messina manuscript is referring to a local earthquake, namely the one for which there is evidence in 853 A.D. Since research on liturgical manuscripts has been confined to just a few texts, and since there have been few attempts to assess their contents from a historical point of view, we think it likely that further research of this kind might produce interesting results in the future.

traces of historical earthquakes

The only occasion when the image of the earthquake appears in the Koran is in the title and first lines of Sura 99.1, where it is not a forewarning of the end of the world, but a representation of that end itself:

the Koranic interpretation

When the earth is shaken by a great tremor / when the earth yields up its burdens / and man shall say: 'What ails it?' / On that day the earth shall tell its story.

The use of such an image is understandable in the context of a series of signs indicating the end of the Earth. These signs recur because they are “supernatural phenomena” in the sense that they subvert nature, but they are natural phenomena nevertheless. Within the mentality of classical Islam, there is a fundamental relationship between man and nature, which is seen as an unceasing work of reconciliation between man and the physical world, through an attempt by man to understand what has been created. Islamic religious culture does not appear to involve an appreciable nature-culture polarity, for everything is, or belongs to or is represented within culture: everything has a meaning which can be deciphered through the workings of a world made to suit man, and is to be understood in terms of its intelligibility.

The Islamic vision of the world places man at the centre, but there is also the broad cognitive area of the natural world as observed by man. This substantially anthropocentric view does not involve the concept of a “law of nature” (it must be remembered that in the Western world, this concept was defined at a very late stage, the beginning of the 17th century, and within a radical conflict with the postulates of the Catholic faith).

In the world of Islam, the concept of “natural law” is replaced by that of a “habitualness” willed by the Creator and observed by the elements of nature, in conformity with the progress of a continuing process of creation. The speculations of Islamic philosophy have grappled with this concept, taking as their starting point an atomistic theory of never-ending creation. Creation is continuous, and leads to a limitless process of semiosis. Order is an order of ideas which finds within chance a constant tendency for phenomena to recur in such a way as to constitute habitualness; but it also contemplates the possibility of variations in repetition, thus allowing for change and breaks in that order (Fakhry 1983).

It is interesting to note that this religious view has not prevented historiography

from presenting earthquakes as “events” occurring in the life of man. But it is not for the historian to “explain” the phenomenon. Some sources, however, see a convergence in time of certain phenomena which are “supernatural” (in the sense that they involve a “subversion of natural order” — to translate the adjectival phrase *khariq al-tabi‘a*. In general, earthquakes belong within a nature that carries “signs” within itself, and is therefore comprehensible in terms of the language of religion, which permeates the world of cognition.

Seismic disasters and the built environment

As we have seen, the religious view of earthquakes transformed a frequently destructive phenomenon into a moment of profound symbolism; and this cultural trend seems to have been related to the conviction that seismic disasters were unavoidable. But over long periods of history, seismic disasters are of sufficiently different kinds to suggest that they are partly “constructed” and “deconstructed” in relation to the characteristics of towns and living conditions, as they developed at various periods.

historical factors
in seismic destruction

These characteristics are examined in various essays accompanying the earlier Italian edition of our catalogue (Guidoboni 1989). They have now been added to and extended; and we think it of some importance to provide a rapid survey of them, because certain factors involved can surely contribute to a better understanding and contextualisation of the data listed in the catalogue. These factors, though described here only in summary form, are intended as an invitation to consider seismic effects as “historical” phenomena, placing due emphasis on architectural and building design as well as on the urban settings recorded in the sources, usually by implication.

Such research has increased recently; but the cooperation between historians and architectural historians (usually through archaeologists) has not yet produced useful results in historical seismology. There is a substantial corpus of documentary evidence about ancient, medieval and Byzantine architecture, but it seems to have been put to little use, as far as the history of building is concerned. Most traditional studies have paid more attention to the stylistic aspects of specialised architecture than to the general characteristics of minor private buildings. And even the little interest shown in earthquake effects on monumental buildings has been largely confined to a few cases of restoration (the Parthenon at Athens, the Colosseum in Rome, Byzantine churches in Macedonia, etc.). Attempts to analyse ancient architecture from an engineering point of view are more satisfactory, at least as regards hydraulics and architects’ understanding of mathematics, largely thanks to the work of German scholars (see Tölle-Kastenbein 1993).

Vernacular buildings ought to provide us with some basic information, but too little research has been undertaken in recent years for us to provide even a partial summary. In certain eastern Mediterranean regions, desertification has assisted the preservation of many original village buildings, thanks also to favourable climatic conditions, but where it would be comparatively easy to conduct research, no particular interest in earthquake effects has yet been evinced (an exception is some research in Syria which has been oriented in that direction, see Balty 1990).

For the purposes of our investigation, it is important to know the size of ancient cities in relation to the number of inhabitants and their distribution in urban areas. But anyone hoping to find reliable population data for the period in question will be disappointed. Neither for ancient times nor for the Middle Ages do we have sufficiently accurate evidence to arrive at accurate figures and calculate averages; and any attempt to establish the population density of a given territory by calculating urban and cultivable areas and counting monuments will be too arbitrary to have any meaning. Even the available numerical data established by Beloch (1886) in the late 19th century must be treated with caution because, as we have pointed out, the figures in ancient and medieval texts are very unreliable.

Ancient cities:
unsolved problems

This is not the place to deal with specific cases. We will simply remind the reader, as an example, that there is no point in counting the number of seats in an amphitheatre in order to gain an idea of the population of a town, for it may be that not all local inhabitants could have gone to see shows, and that spectators might also have come in from neighbouring towns and the surrounding country. And in any case, there is no reason to believe that the size of a theatre or amphitheatre was dictated by a rational desire to seat the entire population of a town: their design was much influenced by the desire to impress and by competition between benefactors and rival towns. Furthermore, it was not necessarily the case that the only inhabited urban areas were those bounded by fortifications. Even in large cities, there were many open spaces, which might have served as gardens or simply been left uncultivated, while a large proportion of the inhabitants would have continued to live in the outskirts or the country. And these people were probably more mobile than is generally realised (see Purcell 1987).

We must also remember that while we have a good knowledge of ancient town planning and its problems (see the bibliography in the surveys by Torelli and Greco 1983 and Torelli and Gros 1988), it is much more difficult to gain a clear idea of the characteristics of urban building design. The most important studies have so far done no more than shed light on certain aspects of building design (types of materials and how they are used); and only recently has a start been made on investigating the structure analyses involved in large-scale building. It is therefore still difficult to obtain an overall understanding of minor buildings. Their development was obviously linked to environmental factors (availability of raw materials) and anthropological factors (building techniques), but little above-ground residential building has survived, and even in well-preserved towns like Pompeii and Herculaneum, it is only recently that appropriate excavation methods have been used to identify those perishable materials which were previously not identified at all or else discarded as being of no evidential value. Though there are sites with a great number of architectural structures above ground level, specialised studies of them are slow to appear. One thinks of the so-called "dead cities" of northern Syria, where entire abandoned villages and towns could be used as a "workshop" for examining building characteristics from the late antique period to the 7th century for both Hellenistic and later Islamic buildings (Wirth 1971).

our knowledge
of ancient building practice

Whether buildings were made of stone, brick or adobe, high population densities and the intensive use of urban space contributed from ancient times onwards to making large towns very vulnerable to seismic activity. These aspects of ancient

historical contexts

building methods have only recently been examined; for traditional archaeology concentrated on public buildings and neglected the study of private ones. Thanks to improvements in excavation techniques, however, we are beginning to obtain important data about private dwellings in both urban and rural areas; but it is far too early to see a general picture.

Only recently have classical archaeologists realised the importance of these problems, the example having been set by their prehistoric or medieval colleagues who, for lack of chronological evidence, have been obliged to investigate even the most detailed technical matters, such as, for example, the use of adobe and similar techniques. On the other hand, it must also be stressed that even the most modern excavation techniques generally tend to ignore the structural engineering of monumental buildings, preferring to confine themselves to theories about the rebuilding and restoration of what they have discovered.

We have to remember that most important areas were originally subjected to intense excavation at times when extensive excavation campaigns were the easiest to carry out, and their aim was simply to identify above-ground structures. These areas have been excavated without regard for establishing successive strata; and it is only fairly recently that the most important indicators, such as ordinary pottery, have been used for dating purposes. Periods such as the late antique, during which there was a tendency to reuse pre-existing structures, have long been neglected, precisely because of the lack of a pottery typology, such as has been developed only in the last thirty years. Moreover, these techniques were adopted only at a late stage in areas such as Greece and Anatolia. In the light of these considerations, we now offer some very rapid reviews (with a brief bibliography) of those urban and territorial contexts which are related to the entries in this catalogue.

The Greek city

There is a tendency nowadays to cast doubt on the very concept of the *polis* — the Greek city state which is held to have conditioned urban and political life in the Hellenic world and the Mediterranean in general. It is indeed difficult to gain a clear idea of what the Greek city was like in archaic and classical times, precisely because of the great variety of distinctions that have been made. Many categorical assumptions have often been arrived at as a result of a literal interpretation of the source: for example, it is commonly held that ancient Sparta did not develop as an urban centre to the same extent as other Greek cities, but was instead a collection of villages. It appears, however, that no-one has related this piece of information, which comes from Thucydides, to that of the large number of victims recorded in the sources for the earthquake of c.464 B.C. (about 20,000); and no confirmation is available from excavation data (bibliography in Musti and Torelli 1991).

We can really only begin to gain an idea of the form of Greek cities after the 4th century B.C. — that is to say, when there began to be adopted that symmetrical urban form (attributed nowadays to the 5th century architect Hippodamus of Miletus, and hence described as “Hippodamean”), whose aim was to achieve a more rational distribution of citizens within the city. It had previously been assumed that cities should be of limited size. For Aristotle, the ideal city had 10,000 inhabitants (to which we must obviously add women, foreigners and slaves, giving

population

a total of about 20/30,000 persons); but these figures were substantially exceeded in cities founded in Hellenistic times, starting with Alexandria, the earliest metropolis known to history (see Jacob and de Polignac 1992).

Later Hellenistic cities led to the spread of this kind of town plan to nearly all parts of the Mediterranean, though mountain communities like those of Anatolia and Armenia remained comparatively free from the tendency. It is nevertheless difficult to arrive at a clear idea of the size of such metropolitan cities, because large cities have not been studied in sufficient detail, or else their original form has been obliterated by later phases of urban development. We know scarcely anything of Alexandria or Antioch, and very little of Damascus or Jerusalem, except in so far as it has been possible to compare rebuilding work known from descriptions in the sources to the cities as they are today. As for private building, the urban model which has been studied more than any other is that of Olynthus, a city in Chalcidice which developed in the 5th and 4th centuries B.C. But since it was razed to the ground around the middle of the 4th century, only the foundations of houses remain. Strange as it may seem, the best term of reference for an understanding of Hellenistic building is in fact still Pompeii.

later Hellenistic cities

The type
of the Roman city

The city type in Italic regions takes its origin from a Romano-Italic interpretation of the Greek *polis*, resulting from contacts established between Greeks and Italic peoples as early as archaic times. But it was the colonisation of the cities of Magna Graecia in particular, which made these contacts more substantial and so led to important cultural interaction.

As Traina (1989 b) has already pointed out, the geographical and historical situation was so very varied and fragmentary that it is impossible to reach a unitary definition of 'city'. Nevertheless, certain attempts to do so have been made in cases where more information is available from the sources, as with the colonies of Magna Graecia. These are areas where the town-country relationship is obviously not limited to the clash between Greek colony and indigenous territory; for the contacts which led to the progressive appropriation of space by the Romans developed in a complex and flexible manner (see Gros and Torelli 1988).

Whereas Etruria developed a genuine culture of the *polis*, the Italic regions still relied on the archaic structure of the *pagus*, a unit of territory whose form governed the way it was used, and gave its character to both the village itself and the wooded or cultivated surroundings. It was around the 4th century B.C., under the influence of political events which affected the whole of Mediterranean society, that towns acquired great importance in Italic areas as well, thus creating a new culture and necessitating the rewriting of myths about origins.

polis and pagus

While the massive advance of Rome brought a new equilibrium to the Italian peninsula, the increase in Roman and Latin colonisation affected lands in the plains, introducing symmetrical town plans (already known in Magna Graecia) and the geometrical subdivision of cultivable land. By applying *limitatio* to the land around towns, which was to prove very popular in Italy and subsequently in the provinces, the Romans were trying to rationalise the use of cultivable land, and this had lasting consequences for towns and their territories.

historical contexts

There is evidence that Rome and Italy were becoming a single unit (and hence acquiring that homogeneous structure which led to the "provincialisation" of Italy in the late antique period) in the monumental building programme of Augustus and his successors. The change in the fabric of towns involved both the town walls — which were now linked by an organic road system — and those principal public buildings which served the social, political and religious life of the town: the forum with its basilicas, temples, markets, baths, and public entertainment buildings. The territory around a town (*suburbium* in the case of Rome, *ager* elsewhere) developed as an organic whole, with a linking road system and scattered minor inhabited areas as well as increasingly imposing *villae*, which were both farms and leisure dwellings. It follows from this that, unlike Hellenistic Greek and Eastern towns, urban settlements in Italy in the form of *municipia* and colonies constitute a political, administrative, military and commercial point of reference, but since they lacked the *plebs* which swarmed throughout Rome (and the surviving cities of Magna Graecia, such as Naples), the potential loss of human life in strong earthquakes was reduced. That explains why inscriptions tend to specify the cause of collapses only in isolated cases: earthquakes or just *vetustas* were evidently considered to be causes of a similar kind.

As the form of the Roman city and its surrounding territory developed in this way (though there were naturally exceptions to the general rule because of special and pre-existing conditions), natural disasters acquired a more material significance and gradually lost their prodigious quality, though that was to return in a new form in late antique times, as religious thought developed, and especially as Christianity spread.

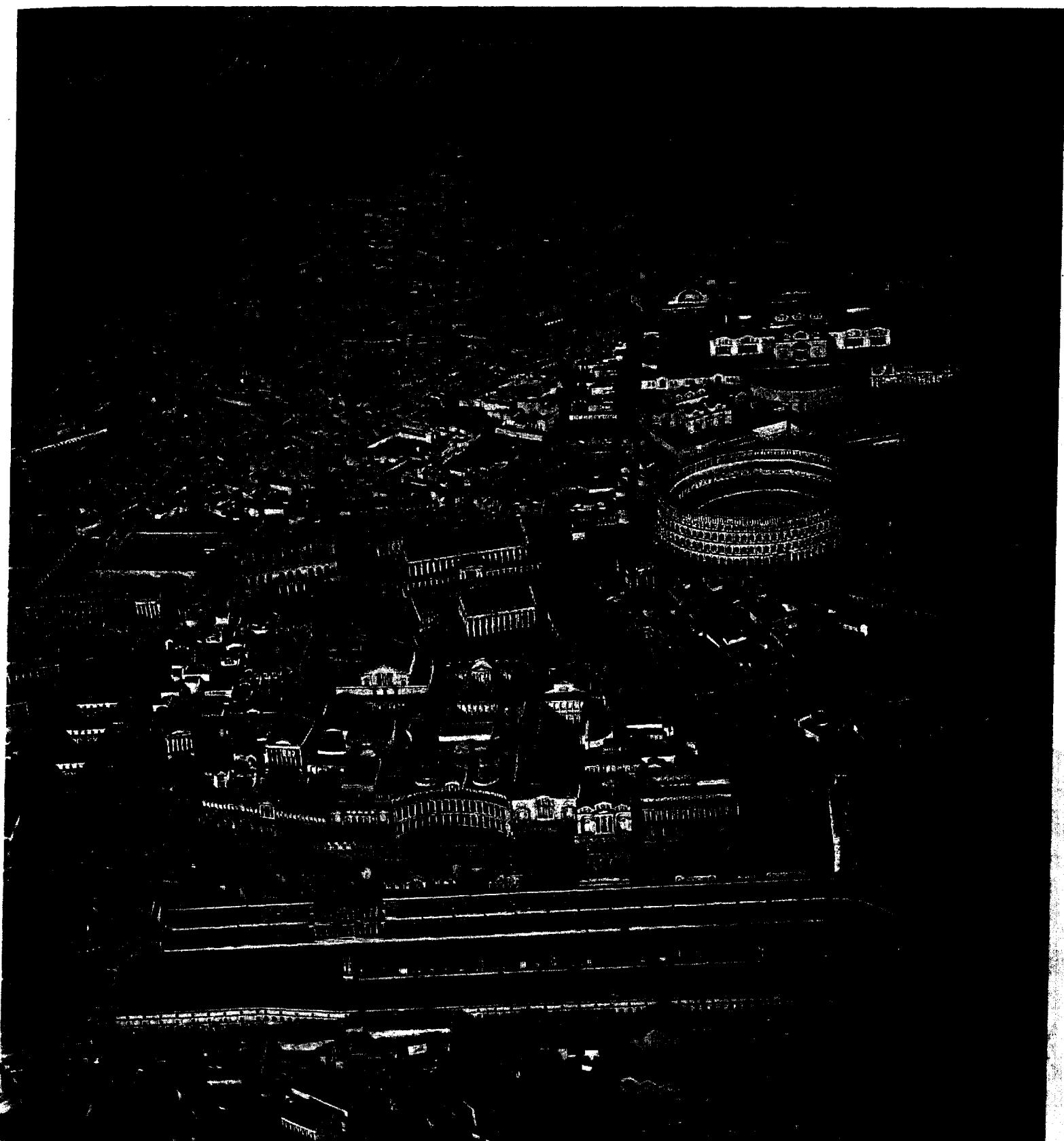
the abandonment
of disaster areas

In the Roman world, it was the need to abandon territory which really was a disaster, and which might have been caused not only by violent and sudden natural phenomena but also simply by changes to territorial structure. The movement of an arterial highway could cause a town to go into economic decline, as could the progressive advance of marshes, or even just the choice of a more suitable site. Our problem, however, lies in the fact that the written sources only record earthquakes in specific circumstances or in connection with specific geographical areas. In any case, the evidence taken as a whole shows that as time progressed disastrous events were "demoted". This failure of the sources to mention earthquakes is normal, and is also found at later periods. On the whole, therefore, it remains difficult to assess the real extent of earthquake damage, unless we have an exception to the general rule in the form of a well-documented case like that of Pompeii.

religious and magical
conceptions of natural
phenomena

The literary texts which tend to record and stress the destructive effects of earthquakes are not ones concerned with daily life, but mostly works concerned with religion or magic; or else they belong to some special genre, such as oracular or apocalyptic literature.

This tendency to marginalise earthquakes, however, is not due to the fact that they were of short duration; for long-term disturbances of the landscape, such as the progressive advance of marshes for geological reasons or the increasing neglect of a territory, would have been equally subject to a process of selection by the sources, and hence almost entirely eliminated from ancient literary works. In fact, neither the encroachment of marshes nor earthquakes can be taken as the principal rea-



Model of the city of Rome as it was in the 4th century A.D. (Museo della Civiltà Romana, Rome).

In ancient times, the effect of panic was much increased by population density, with the result that even minor earthquake tremors could cause public order problems.

son for the abandonment of territory. At the most, such phenomena could have been contributory causes in the development of a situation which had already been undermined by other factors.

town and country

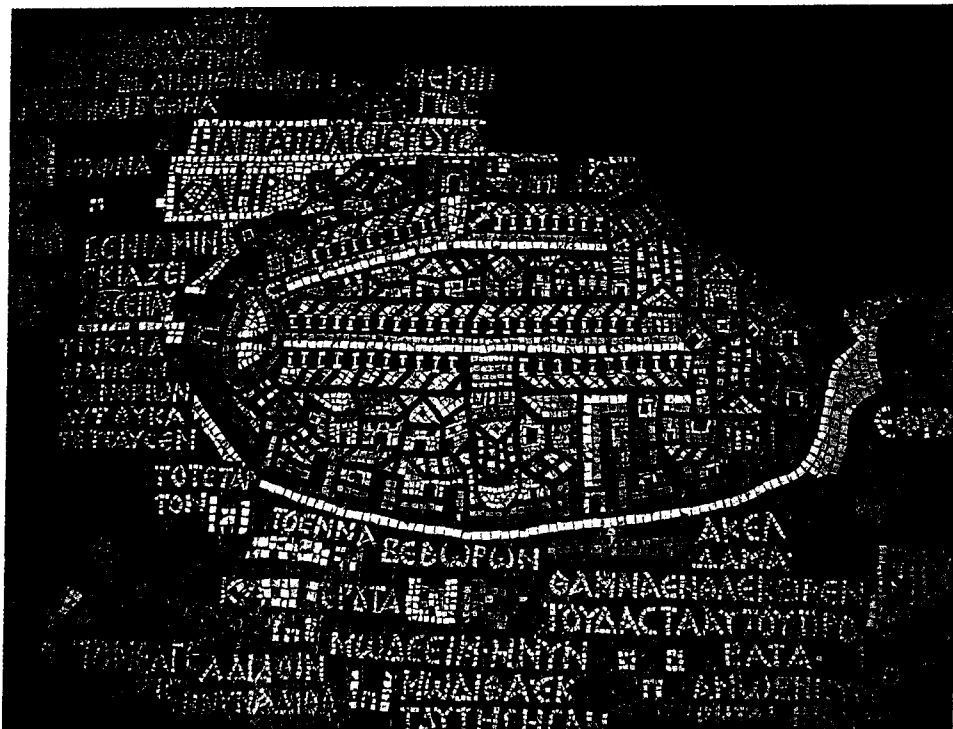
There remains the problem of establishing the actual effect of a seismic event on the places we call "town" and "country". Given the limited evidence currently available, it is generally very difficult to identify damage in a rural area, unless it is a question of sudden disaster striking people and animals; for rustic buildings (*villae, vici* etc.) were in any case subject to a continual process of restoration, as structures deteriorated or farming procedures changed.

In the ancient world, towns served above all as meeting places and for public life, while the territory in the immediate vicinity of the urban area was used for a kind of extension of urban activity. The Roman or Italic town, in particular, derives its *raison d'être* from this presupposition, which permanently links the town (whether as pre-existing settlement or as colony) to its *ager*. But there were bound to be exceptions. The extraordinary development of cities like Rome, and Eastern metropolitan cities such as Antioch, Nicomedia, Ephesus and, later on, Constantinople, produced a concentrated urban population greater than that found in Italian cities in the Middle Ages (13th-15th centuries).

the great cities of the eastern Mediterranean

Furthermore, there seem to have been substantial differences between the situation in Italy and the Latin-speaking Western provinces, and that pertaining in the other Mediterranean provinces, where the Hellenistic city tradition had preserved its municipal structure, and where, above all, there was long-standing exploitation of the imperial authorities, which would promptly intervene whenever natural disasters in Asia Minor necessitated a financial contribution or fiscal exemption (Mitchell 1987).

In the case of very destructive earthquakes affecting highly populated areas that were politically important, we do not find that in the classical world they aroused



Plan of Jerusalem in a 6th century A.D. mosaic. Orthodox church of St. George, Mādabā, Jordan (photo J. Taylor, Sonia Halliday Photographs).

those reactions (involving a kind of "anxiety of the times") which we notice from the time when the development of Christian apologetics took place in the 2nd and 3rd centuries A.D., and which are even to be found in a pagan author like Libanius (see the evidence for mid-4th century earthquakes in the eastern Mediterranean).

The Greek and Byzantine regions were regularly buffeted by earthquakes, which formed part of the history of many cities in the Near East. And unlike the cities of the early medieval West, those of the eastern Mediterranean never lost their role and importance as centres of political and religious power.

Such tendencies ran counter to the idea of a pacified city whose internal security was guaranteed by that of the whole *ecumene*, which was in its turn protected by the imperial authority.

In a way, this contradiction is characteristic of the whole age of imperial Rome. On the one hand, we have the typically Greek idea of the civil *oikoumene*, which by definition had a large complement of cities and was totally unlike the barbarous life-style of nomads and anyone else who did not normally live in what could be defined as a *polis*; and on the other, we find the classical Roman concept of *impe-rium sine fine*, where, in theory, any territory could be invaded and colonised. In late antique times there was a utopian attempt (it foundered at the time of Justinian, who was one of its greatest proponents) to reconcile both these attitudes by creating an urban civilisation even in the remotest outposts of empire, such as the deserts of Africa or the plateaus of Anatolia.

For the period from the 4th to the 6th century A.D., we do not always have a clear understanding of the real effect of economic changes and reactions to natural disasters. While it is certainly the case that there existed a situation of discontinuity and more marked separation between town and country, the fact that the two became more clearly separate as the early Middle Ages progressed, obliges us to face up to the vexed question of urban decline. A pessimistic view of the survival of urban structures in late antique times, seen as a transitional period between the ancient and medieval worlds (Ward-Perkins 1984), seems unjustified, in view of the building incentives which we find in Rome and other Italian cities in the 4th century A.D. (Giardina 1986, vol.2).

Ravenna — a capital city in the 5th century A.D. — is itself a symbol of this changing urban society, for it had the courage to use lagoons and marshes (as did Venice, later on) as the site for the new city, whose role was primarily concerned with trade and the military control of a world where cultural innovations were being introduced not only by the new Christian culture, but also by the very "barbarians" who were settling the countryside and becoming involved in military and political life. The early medieval Italian town had its own characteristics, which were to some extent different from those found in ancient times; for even though the degree to which changes were continuous or subject to interruption has not yet been completely elucidated, those which took place between the 6th and 10th centuries certainly encouraged the ruralisation of many towns, produced falls in population, and brought about a widespread predominance of rural over urban values, thereby indirectly creating conditions in which those factors which make an earthquake destructive became less influential.

Changes from the
6th to the 10th century:
the case of Italy

new centres of power:
Ravenna

In our present state of knowledge, it is not possible to be sure whether the early Middle Ages were characteristically a period of depopulation in Italy and the West. The 6th century was undoubtedly a troubled period, with wars, invasions and plagues; for the disastrous Graeco-Gothic war of 535-551 was followed by a succession of plagues affecting the whole of southern Europe. So widespread and serious was this phenomenon that there was nothing to compare with it in the whole of the European Middle Ages, except for the Black Death of 1348. And then there was the military occupation by the Lombards in 568 or 569. Wars, famine and plague certainly hit the Italian peninsula harder than in the past; and it seems clear from authors like Paul the Deacon that their social and demographic repercussions were widespread throughout the 7th century as well. And while all this was going on, towns were undergoing a process of christianisation: public monuments were losing their original function, and urban life was shifting its focus towards religious buildings. However, we naturally cannot establish rigid categories to describe the general situation. As far as Italy is concerned, there have been a number of interesting general surveys, such as those of Fumagalli (1976, 1978), but there is no doubt that life varied a great deal in the various regions, where the original settlements were somehow returning to the fore, thereby placing in jeopardy the process of standardisation which Rome had been attempting to impose on the form of cities (and their territories). It was no coincidence that an "alternative" model came on the scene in the form of Venice, with the result that the city built on a swamp actually became an ideal. If the ideal city of ancient culture had previously eclipsed these "marginal" types, of which Ravenna is an example (see Traina 1988), settlements in such terrains were now being discovered by the dominant culture; and that clearly affected the way building developed. Thus, where there were no ancient buildings whose materials could be reused, the great difficulty in obtaining bricks or building stone gave an impetus to a type of architecture which used poor materials such as wood, rushes and adobe; and we have seen how widespread this could be.

Nowadays we may think that these techniques were inherited from antiquity and were not just a "barbarian" alternative to the classical model of the dwelling place. Recent trends in archaeology — especially those concerned with "the archaeology of the First Millennium" (Randsborg 1992) — are very largely responsible for providing a clear demonstration of the limitations of traditional historiography, which offered an attractive but "romantic" contrast between barbarians and inhabitants of *Romania*.

These more strictly technical aspects of building methods confirm the need to reject the model of the Middle Ages as breaking away from antiquity, however attractive it may be. For the transition of society from ancient to medieval can be interpreted as a contradictory mixture of continuity and survival, in which the barbarian element was probably less important than is generally thought.

It is certain, at any rate, that ruins were a new element in inhabited areas and were beginning to play a significant role. The remains of important but abandoned buildings were an immense source of stone for new houses, castles, roads and bridges throughout the Middle Ages. Privileges granted by kings and emperors permitted their use by monasteries which they had founded, as well as by

bishops and even private citizens. In this way, Italian towns were already entering a period of reconstruction as early as the 7th century. There were laws governing the use of ruins (*Corpus Juris* 7.3), though they only came to be used on a grand scale when the great urban expansion of the 11th to 13th centuries took place. In spite of this crisis, there is evidence that many Italian cities were continuously inhabited (Milan, Aquileia, Pavia, Verona and Naples, to mention only the most important). Others went through a stage of decline, however, in which the inhabited area shrank, with the result that some towns in the Po valley contained a "dead town" — an area which had been completely abandoned by the inhabitants. This was the *civitas antiqua* or *civitas antiqua et rupta*, which remained so until the 11th century (Bologna and Parma are examples). Some generations later, these ruins were vaunted as evidence of an ancient origin and a worthy past. In many parts of Italy, a revival of urban life and agriculture took place from the 7th century onwards, but the network of settlements and the landscape only changed after the 10th century. In areas that remained under Byzantine jurisdiction, rather less ruralisation took place, and towns were able to preserve their urban qualities in a more stable way. However, there were changes of various kinds in the way land outside the towns was used; for the economy was overwhelmingly agrarian, with woodlands and pastures. In both town and country, building structures, too, were more flimsy and less sophisticated than before, though the areas which escaped Lombard and later Frankish control were not involved to the same extent. Cities like Milan and Pavia were particularly important, but until the 10th century they, too, were thinly populated and small in area, and their activities were not of an "urban" kind. Houses were mostly made of wood, and were situated in fields, vineyards and orchards. Walls were flimsy and not always made of stone. While it is true that Italian cities acquired renewed vigour in the 8th and 9th centuries, they nevertheless did not regain the strictly urban physiognomy which they had had in previous centuries, the only exceptions being the coastal towns in the hands of Arabs or Byzantines, even though they might have been occupied temporarily by the Lombards. It also has to be remembered that the invasions which took place towards the end of the 9th century were as widespread and devastating as they had been in the 5th century, and so helped to destabilise and impoverish the living conditions of city dwellers. Invasions by Normans and Hungarians from the north and east overlapped those of Islam from the south, gripping western Europe in a vice, laying siege to it, striking at it with incessant raids, and camping within it for long periods. It is important to keep all these factors in mind, if we are to assess the background to the "destructions" which are frequently mentioned in the historical sources for those centuries. The ruins are nearly always recorded without their cause being specified — but they have not infrequently been later interpreted by historians and archaeologists as resulting from earthquakes.

cities not subject
to decline

wars and invasions

How large were early medieval towns in the West? Their size is not easy to establish. According to Renouard (1976), the towns of central and northern Italy suffered less from the barbarian invasions than those of France, and remained larger. When the western Roman Empire came to an end, the size of certain Italian cities was as follows: Florence 24 hectares, Pavia 25, Verona 35, Lucca 39.

size of urban areas

historical contexts

At that time Italian cities were the largest in the West. At the time of Theodoric (late 5th-early 6th century), Parma was increasing in size, expanding to about 23 hectares from a previous 14; but the new city walls enclosed gardens and other open spaces.

Rome Rome underwent profound changes in the 6th, 7th and 8th centuries. Its siege by the Goths and conquest by the Byzantines, famine, epidemics, the difficulty of maintaining food supplies and the consequent fall in the population were all factors which contributed to the creation there of a markedly rural economy.

At the time of Gregory the Great (6th century), only a few parts of the substantial area enclosed by the Aurelian walls were still inhabited. According to Krauthimer (1980), there may not have been more than twenty thousand inhabitants. Other historiographical assessments tend to give greater stress to elements of continuity between the ancient world and the early Middle Ages in Rome, and offer population estimates which are much more optimistic, but not always acceptable (Cecchelli 1959).

If we keep in mind the evidence of building and reconstruction work by the popes in churches and other religious buildings from the end of the 6th to the 9th century, as it appears in the *Liber pontificalis*, we have the impression that — particularly from the 7th to the 9th century — an appreciable amount of urban reorganisation was going on in Rome. But, as Delogu (1988, p.381) points out, this growth was not due to a productive increase in the economy, but solely to the handsome donations received as a result of the particular religious prestige which the city was acquiring in relation to the imperial political power.

In Roman times, Bologna covered an area of about 70 hectares, with an estimated population of about eight to ten thousand. At the end of the Roman Empire, it covered about 25 hectares with a population of perhaps three thousand.

We have pointed out that, generally speaking, there is little information available about earthquake damage to Italian cities in the early Middle Ages; and the little information we have is mostly related to new centres of political power, or cities controlled by the Byzantines, whose urban appearance, as already mentioned, was superior to that of cities in Lombard or (later) Frankish territory. We do have information in early medieval sources about Ravenna, where Agnellus was writing. The city had already been the seat of imperial vicariates in the 5th century. Theodoric subsequently held his court there, and it was the capital of the 6th century prefecture of Italy as well as of the Exarchate. At the time of Bishop John V (between 725 and 744), an earthquake is recorded as having occurred there.

There are monastic chronicles from Germany which not infrequently mention earthquakes in Italian towns, such as those at Treviso in 778 and at Pavia (capital of the Italian kingdom) in 836. The only reason why the earthquake of 801 was not forgotten, was probably the fact that Charlemagne was at Spoleto at the time, the city being the capital of a large Lombard duchy, and later of the Carolingian march. And the same seems to be true of the earthquakes of 848 and 990 (or 989) at Benevento, the capital of a major Lombard duchy.

We have pointed out that earthquake effects are recorded chiefly in relation to capital cities and rarely in relation to small towns and villages, though they might be mentioned if they affected the great monasteries, which were a new aspect of

traces of earthquakes
in Italy in European
monastic annals

the way early medieval settlements were organised. It is thus the annals of the Abbey of Montecassino which record a number of important earthquakes and list minor country towns amongst the places damaged (see, once again, the earthquake of 848). The hypothesis that in the long term there are swings in seismic disaster frequency to a degree which is greater or lesser depending on the characteristics of the inhabited environment concerned, is not one of which the truth can be immediately demonstrated. One needs to have a thorough knowledge not only of the available sources, but also of the history of the area concerned. As far as Italy is concerned, at any rate, it is possible to identify certain of the factors involved and formulate some hypotheses. In the course of our research, we ascertained that the number of recorded earthquakes in early medieval Italy is much lower than in the later Middle Ages: there are 16 recorded for the 6th to 10th centuries, but 205 for the 11th to 14th centuries having an intensity equal to or greater than IV-V MCS (Postpischl 1985): 25 earthquakes out of these had an intensity equal to or greater than IX on the MCS scale. In our opinion, this is not simply a question of a smaller number of available sources. Other factors are involved, such as:

long-term swings in seismic disaster frequency in Italy

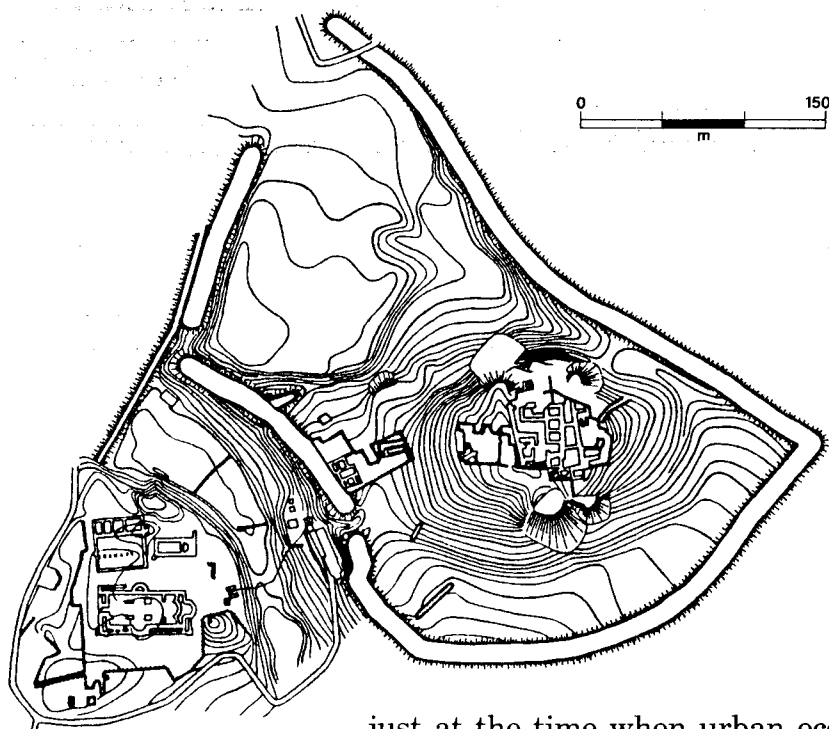
- 1) social and economic conditions during the period from the 6th to the 10th century. These were generally so troubled that other disasters, not necessarily natural ones, might have been deemed more deserving of record than earthquakes;
- 2) the religious attitude to disasters, which tended to undervalue their social effects. To which can be added, in our opinion, the influence of a certain intellectual indifference, in the form of that *tedium vitae* which often caused ecclesiastics and monks to fail to notice the intensity of human suffering;
- 3) communication problems affecting the reporting of earthquakes. Apart from the long distances involved, we know very little about roads in late antique and medieval times in Italy.

different living conditions and cultural filters

Even if all these factors were taken into account, however, we still do not think that there would be a wholly satisfactory explanation for the scarcity of information about seismic disasters in Italy, bearing in mind that an average of 30 destructive earthquakes (with effects equal to or greater than IX on the MCS scale) occurs there every hundred years.

We therefore think that factors governing living conditions must have had a decisive influence. The large uninhabited areas inside city walls may have limited earthquake destruction; and then there is the fact that private buildings, in both town and country, were usually, if not exclusively, made of light materials (wood, wattle, straw etc.), which could be very influential in mitigating the destructive effects of earthquakes and preventing them from becoming "seismic disasters".

In the later Middle Ages (12th-14th centuries), there was a substantial increase in urban population, which absorbed what had previously been open spaces within towns. This increase in population density, moreover, was accompanied by a decrease in the level of protection against earthquakes, thanks to the common use of increasingly heavy materials in private as well as public buildings. And then there was an increasing tendency to build upwards, mostly by adding to existing structures, and very often in stages (traces of this can still be identified in small towns in Sicily). From the point of view of seismic effects, we think we can identify a widespread deterioration in living conditions and a decrease in building safety,



Plan of the citadel of the ancient city of Dvin, which was the capital of Armenia from the 4th to the 9th century. It was invaded by the Arabs in 642, and was partly destroyed by the earthquake of 893 – the year in which the patriarch moved his seat to Zvart'no'c. After the arrival of the Seljuk Turks, the city was completely reduced to ruins (from Cuneo 1988).

just at the time when urban economies were developing the most. The tumultuous growth of medieval towns in Italy produced very high levels of seismic risk, as one can tell from the destruction caused by many strong earthquakes. And in both modern and contemporary times these conditions, far from improving, have continued to deteriorate, accompanied as they have been by population increases.

Byzantium and Armenia

After the 6th century, the ideal of the city inherited from classical culture began to decline. From the 4th century up to the time of Justinian in the 6th century, many emperors had tried to re-establish an "urban" culture by founding and rebuilding towns; but their costly and utopian plans were frustrated by war, and particularly by the advance of new models of the city centred on church institutions. Thus, while the centre of Constantinople continued its massive development and late antique cities alternately lost and regained their ancient splendour, in the region of Anatolia traditional forms persisted, based as they were on scattered rural settlements which depended on large estates. As they had been for centuries, the towns were situated along the coast and the great commercial arteries, whether inland or on rivers (see Mitchell 1989).

In late antiquity, the eastern world was divided between large graecophone cities and communities where local cultures and languages (Egyptian, Syriac, Armenian etc.) predominated. As we have already pointed out, there are no thorough studies and assessments of these local communities, though substantial remains have survived and are often well preserved (see Brown 1978).

In spite of what has sometimes been suggested, the advance of Islam did not lead to the nomadisation of the land. Even after the Arab conquests, regions with a Byzantine tradition preserved their rural or urban organisation. If some towns went into economic decline, that was due to factors which are much more complex than just "bedouinisation".

As far as the region of Armenia is concerned, there has been debate as to whether

continuity
in Byzantine cities

it is possible to speak of a genuine urban culture (Garsoïan 1985). There is certainly evidence for some busy towns, whose *raison d'être* lay in the power of the reigning royal family and whose commercial life was like that of nearby towns in Cappadocia or Mesopotamia. But generally speaking, it was the scattered settlements along the narrow valleys of the plateau that were typical of Armenia. The legendary destruction of the city of Aršakawan (was an earthquake perhaps involved?) is a sign of the refusal of the Armenian feudal nobility to accept this kind of urban settlement, for we are told that about 363 Arsaces III wished it to be destroyed, and this immediately happened by "divine will". The region of Armenia was traditionally divided into cantons, each of which was controlled by a "feudal" clan, which was itself subject, to a greater or lesser extent, to the authority of the king. Most permanent settlements consisted of mountain fortresses, to which were added numerous monasteries after the area was christianised. Around these settlements villages grew up, but their existence was perpetually threatened by famine, invasions, civil war and, of course, natural disasters. But little evidence remains of all this. While it is true that echoes of earthquakes persisted in Armenian history and religion, only in rare cases do we have precise information. The destruction of the whole valley of Vayoc' Jor in 735 was an exceptional occurrence, in that there were a great many victims; and the earthquake of 893 at Dvin was seen as a major tragedy, because as the seat of the patriarchate of the Armenian church it was the spiritual capital of the whole country.

villages, fortresses
and monasteries

It is well known that Islamic civilisation was essentially urban, to the extent that massive urban demographic and economic development became a specific characteristic of the Islamic world. The nature of cities in the Islamic world was very different from that of the small contemporary cities of the West which we have referred to above.

Metropolitan cities
in the countries
of Islam

In reviewing Islamic urbanisation, Cuneo (1986) and Burlot (1990) have shown that it took two forms:

- 1) the creation of new cities in the countryside, such as Basra, Kufa and Kairouan, which acquired additional importance from their military role;
- 2) the restoration and expansion of many ancient towns in Syria and Iran. This was often accompanied by the foundation of a new city nearby and its later absorption by its older neighbour. Examples of this are Bukhara, Sarmarkand, Nishapur and Merv.

In the period that concerns us, the city most frequently mentioned in Arab sources for the earthquake damage it suffered is Cairo, which was founded in 641 beside a small town of Graeco-Roman tradition. It was only a century later, in 749-750, that the new Abbasid government founded the city of Al Askar, with a palace, mosque and market. In the year 872, the governor set up his headquarters in the north, at Al Qatai ("the concessions"), distributing plots of land amongst his Turkish officers and building a mosque and a palace. Only in 969 was Cairo itself founded (Al Kahira, which means "the victorious").

The history of Islamic cities is linked to political developments, and is often punctuated by major disasters, including war damage, fires and earthquake destruction. The most surprising characteristic of these cities, by contrast with those of

the most densely populated
cities in the Mediterranean

the western Roman tradition, is their size. The dimensions of the inhabited area were greater than anything known in the West, and comparable in some respects only to those of a few large cities in the Byzantine region. The population of Cairo is thought to have exceeded one million in the 9th and 10th centuries, while Cordoba and Damascus had three or four hundred thousand inhabitants.

Cities in the Islamic regions can be recognised as having certain common characteristics of form, even though their plan and layout have been obscured by subsequent superimpositions and their often chaotic growth. The great mosque was usually in the centre, with cultural and commercial activities spreading around it, very much as in the case of small towns in the medieval West. Like the latter, Islamic towns were enclosed by walls, which sharply separated them from the surrounding countryside, and emphasised their commercial nature, based on merchandise imported from great distances. Small local markets, on the other hand, were situated outside a city gate. Apart from those involved in commerce and well-developed artisan activities, Islamic cities also had a substantial administrative and financial bureaucracy, not to mention a considerable military presence, of which there is evidence in the way the urban space is divided up (ground for military manoeuvres, hippodromes etc.).

Nomads,
semi-nomads and
shanty-town dwellers

Albeit in a partial and inevitably summary way, we have tried to reach a general understanding of the exceptional body of data and reflections on earthquakes produced by the various Mediterranean cultures, and in this way we have shed light on a less than self-evident relationship between the inhabited environment and seismic effects: for we have shown that while the image of the natural seismicity of the past has been based, in our culture, on historical records of destruction, that is not an approach which can be considered exhaustive. We have therefore also had to ask ourselves about the nature of seismicity in areas inhabited for long periods by nomadic or semi-nomadic peoples, who were accustomed to living in "light-weight" dwellings (tents or huts made of vegetable materials), and remained in mobile or semi-mobile settlements for a very long period, leaving no disasters or records of destruction behind them. We have in mind the inhabitants of the north African coast, who were envied by Italian scholars in the 17th century as the only people who had known how to face up to the terrors of great earthquakes in a practical way. The presence of nomads has been ignored by the sources, however, or else — in the cases where they gained power — their invasions were described as the cause of the abandonment and desertification of the areas invaded. Historians have not always succeeded in assessing the real value of such assertions; though the fact is that cultures like that of Greece tended to consider areas which were in fact inhabited by barbarians as "deserts". The same was true of the countryside in Roman Italy, for when many areas were swarming with slaves, "civilised" sources in one way or another tended not to consider these inhabitants as people. And the great migrations of Germanic and central Asian peoples were viewed in the same way.

Even nowadays, the nomad/city dweller dichotomy is interpreted by historians in terms of modern conflicts. One only has to think of the interpretation of Arab migrations as Bedouin hordes directing their assaults at "Western" civilisation —

an interpretation which in reality makes no sense, since the fulcrum of Islam was, as we have already pointed out, its great trading centres and towns, which were extraordinarily large for their time. It might now be worth exploring the oral traditions of the nomads or former nomads from this point of view, in the hope of tracking down unwritten and non-archaeological traces of seismic activity in their countries, whether the effects were disastrous or not.

forms of dwelling
marginalized
by historiography

Even towns, moreover, had their “marginal” forms of dwelling, and there is still work to be done in exploring the traces of those areas of tents, shacks and shanty-towns which were scattered immediately outside city fortifications. Perhaps because we have been led astray by the ideal image of the ancient or medieval walled city as it appears in illustrations of the time, we have lost sight of certain aspects of a civilisation which was much more complex and varied than that image suggests, as other kinds of evidence make clear.

Construction techniques: elusive variables

Roman building is to date the best understood of the ancient world. Thanks to recent important research by Adam (1984, 1986 and 1989 b and c), and the fact that we have in Pompeii an unique observational workshop, and thanks also to a certain recent tendency in archaeology to take an interest in the minor and rudimentary buildings of mountainous and outlying areas (such as Friuli and Slovenia), it has been possible to establish the salient characteristics of this type of building, and look at it in relation to earthquakes.

Roman regions

Adam (1989 b) points out that a careful analysis of Roman buildings in the empire as well as in Italy, shows that if Roman builders were employing skills that were not entirely original, at least they were making intelligent and opportune use of local architectural techniques and customs, selecting and improving as required. The Romans acquired their building techniques from the Etruscans, the Greeks and even the rough-and-ready builders of southern Latium. The two most convincing examples of this surprising amalgamation of techniques are to be found in the two most representative forms in Roman architecture: the vault and mortar-bonded masonry (Lugli 1957).

the vault and
mortar-bonded masonry

Neither of these was a Roman invention. The vault was invented by the Egyptians and Mesopotamians around 3000 B.C., and was used by the Greeks from the 4th century B.C. onwards, though not to any great extent. Similarly, the use of gypsum for making bonding mortars was common in Egypt from the 3rd millennium and, much later, the Greeks made frequent use of lime mortar especially for plastering tanks and cisterns and making stuccos (Ginouves and Martin 1985; Ginouves 1992).

It was by perfecting these two techniques and applying them systematically that the Romans gave architecture an impulse such as it had never known before. The fact that this new constructional skill was so accessible meant not only that building public monuments was easier and quicker, but also that even more modest private buildings could aspire to something monumental, using the same techniques and often achieving the same appearance as more luxury dwellings. But the innovations in Roman building techniques did not stop there.

It is well known that Vitruvius' *De architectura* mentions various techniques for building foundations and superstructures. He mentions not only *opus testaceum* — the most frequently used technique in Rome — but also some techniques going back to early historical times and used by the ancient Italic peoples: such as *opus latericium* which used unbaked clay and straw bricks with a wooden core, and *opus incertum*, which consisted of a layer of mortar into which were inserted pieces of stone of irregular prismatic shape. Vitruvius' chief interest is in large-scale monumental buildings, so he obviously pays little attention to these crude techniques, and only mentions unbaked clay incidentally, as a binding agent to be used in both foundations and superstructures.

As we have already mentioned, archaeologists interested in things Roman have so far paid little attention to these matters, being more attracted to important monumental and public buildings. Furthermore, the materials found in the earliest archaeological evidence of minor buildings in rural and urban sites, such as stone, river pebbles, earth, unbaked clay and wood, are both natural and much subject to deterioration.

traces of humble Roman
buildings

Recent excavations (Santoro Bianchi 1993; Santoro Bianchi and Ghermandi 1994) suggest that the early historical building tradition exerted a preponderant influence well into Roman times. This tendency of earlier building techniques to persist may perhaps have prevented "poor" ancient builders from realising that if they had adopted new techniques and materials they would have had the advantage of making buildings more solid and durable. There appears to have been a sort of inertia in antiquity as regards adopting building techniques which were different from those laid down in a centuries-old local tradition, even though materials like adobe were very obviously subject to decay. A similar cultural phenomenon can be found even in recent times in peripheral economic areas. Such a situation must have been partly the result of the lack of a dynamic economy, or else occurred within purely subsistence economies. We still lack quantitative assessments which would allow us to have a clearer idea of the commonest building typologies in certain areas.

If we wish, however, to have an idea of "innovations" made by the Romans in the context of earlier buildings, we have to look at Pompeii, for it is a "laboratory" where a wealth of observations about private architecture can be made. It is where our most important information comes from. In our opinion, the most thorough and important studies on Roman building techniques are those of Adam (1984), and our comments on Roman civil architecture make use of his work.

urban building practice:
Pompeii as a "laboratory"

The city of Pompeii was clearly defined by its surrounding embankment, enclosing an area of about 9 hectares, and it is likely to have had a stable population of twelve thousand. The only fairly important monuments we find there are public entertainment buildings: the amphitheatre, the theatre and the Odeon. The other public buildings, whether temples, arches or the *macellum*, are of modest proportions, while only the basilica is of fairly imposing size. As for private buildings, they are, with rare exceptions, on a family scale and have no more than one or two floors: there is only one house with two floors above the ground floor. This is very different from the imposing façades along the *insulae* in Ostia or Rome, whose height and poor quality construction had led Augustus to limit them to 20 m above

ground level (Strabo 5.3.7).

Unlike building projects whose plans reveal the considerable differences between the most luxurious and the most modest dwellings, Roman building techniques do not vary from the most elegant *domus* to the humblest workshop; and indeed, it is perhaps the most democratic aspect of Roman civilisation that its architecture was available to all.

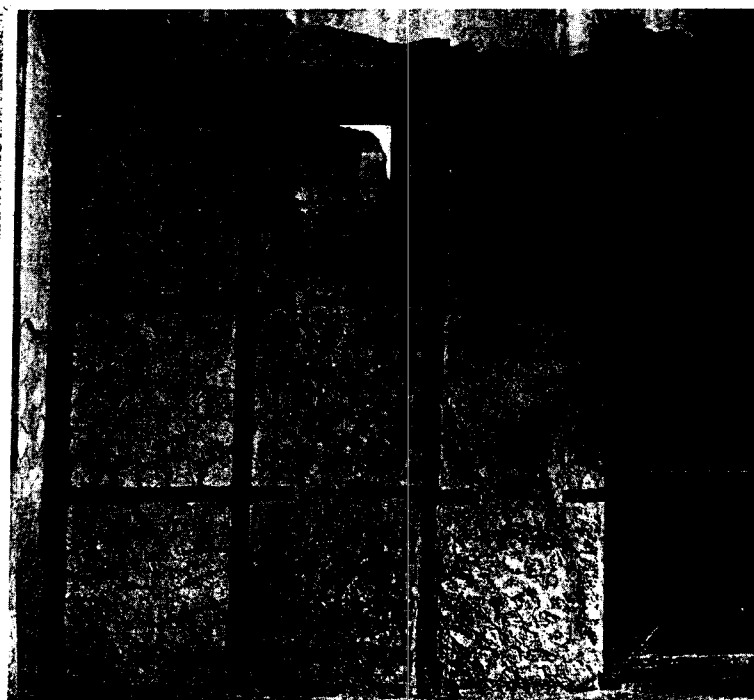
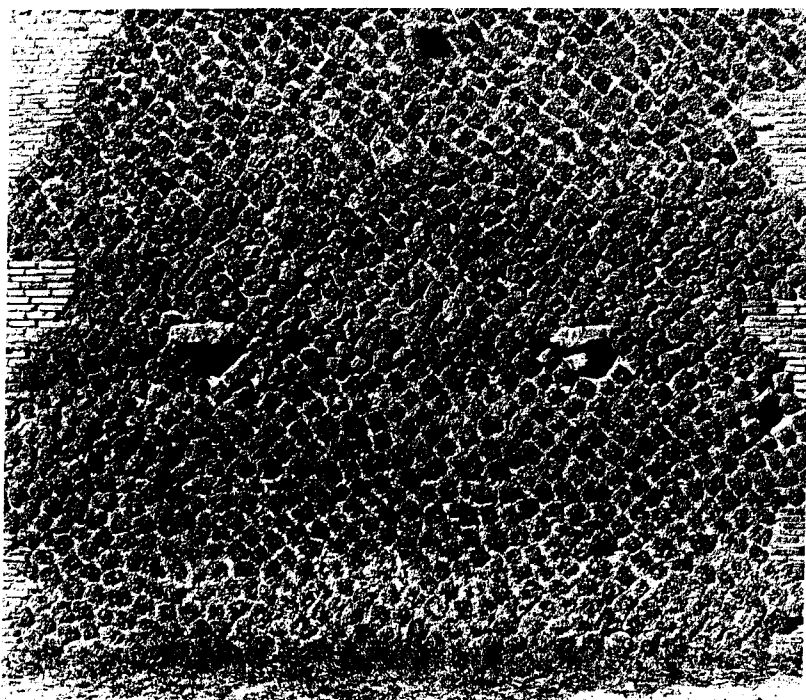
Builders at Pompeii had a particularly wide variety of building stone available. Beneath the soil and on the slopes of Vesuvius there were as many as six different types of rock suitable for building purposes: hard lava, taken from eruption streams, porous lava, three types of volcanic tufa (Nocera, Pappamonte and yellow), and a calcareous tufa found in the ancient marshes along the banks of the Sarno, which was of a type exactly like Roman travertine, but softer and less attractive. And in addition to this long list, there was a lovely white limestone imported in Augustan times, and various imported marbles, used more for decoration than building, not to mention the bricks which served at an early stage as a finishing material and were used on a massive scale after the earthquake of 62 A.D. According to Adam (1989 b and c), it seems likely that at Pompeii, as was usually the case everywhere else, the earliest buildings were poorly constructed, using ill-assorted materials. Perhaps the first houses, which have now disappeared, were indeed built like that, but the evidence we have for the earliest periods — we are now talking only about private buildings — suggests, on the contrary, that architectural standards were surprisingly high.

One of the earliest houses — well-known largely because a doctor's bag was discovered there — is the House of the Surgeon, which was built in the 4th century B.C. This old house has a fine façade in large *opus quadratum* limestone blocks, and exactly the same kind of facing is found in other, less well-preserved houses of the same period. The internal walls are less carefully constructed, using a mixed technique consisting of pilasters of large stone blocks joined by stone panels bound together with clay mortar, this being what was known as *opus Africanum*. Later on, internal partitions and buttresses were made of *opus craticium*, which was of similar type to *opus Africanum*, but much lighter, allowing masonry walls to be made much thinner. This is the earliest architectural period of which something has been preserved, and because it makes copious use of limestone, it is known to architects as the “limestone period” and to historians as the “first Samnite period”.

This first period ends about 200 B.C., by which time builders were much influenced by the spread of Hellenistic culture and began to use a different material: Nocera tufa, whose fine, close grain made it possible to produce better quality facings and mouldings. This may well have been the period when Pompeii produced its finest architecture, and it lasted for more than a century, until the end of the Social War and the settling of Pompeii by a Roman colony in 80 B.C. It is known as the “tufa period” or the “second Samnite period”.

It is no coincidence that there was a revolution in masonry building techniques in Italy when an end came to the great 2nd century campaigns of conquest: the wars against the Carthaginians (the Second and Third Punic Wars), the wars for supremacy in the Aegean (victories in 197, 190 and 146 B.C.) and the war against

masonry



Opus quasi-reticulatum *Opus craticium*

Spain (victory at Numantia in 133 B.C.). These conquests provided extra supplies for the slave market, and so made a great deal of slave labour available for use in simple and repetitive building work.

The materials used to cover masonry surfaces were no longer the irregular stones of *opus incertum*. Instead, as in Rome, a regular design of rectangular facing was used setting the courses at 45° — an angle which provided better interlocking, the corners being made of courses of saw-tooth bricks or rectangular pieces of stone. This type of facing, although still irregular in its early stages, was given the name *opus quasi-reticulatum*, and later developed into the elegant *opus reticulatum* of Augustan times, which remained in use until 79 A.D.

The earliest materials used for building masonry of this new kind at Pompeii were either the lava which we can see not only in the amphitheatre, the Odeon and the Forum baths, but also in private houses, or else, less frequently, the limestone which we can see, for example, in the large cistern belonging to the Forum baths. Later on, these materials were either replaced or added to with the whole range of stones mentioned above, thus achieving, whether by accident or design, polychrome facings which house-owners sometimes hid under the plaster used on the façade.

brickwork Bricks were used much earlier in Campania than in Rome; they first appear at Pompeii as early as the end of the 2nd century B.C. Until 62 A.D., however, they were simply used to finish off different types of masonry: in corners, for example, or else to level off horizontal planes, forming, together with the stonework, what is known as *opus mixtum*. After 62 A.D., however, this material was produced in great quantities and at great speed with almost industrial regularity, and was used in both public buildings and private houses for covering façades or erecting reinforcements where buildings had been damaged in the earthquake of that year. We do not have a survey of proto-Byzantine building construction techniques, though some fairly important information has been gathered in certain specific

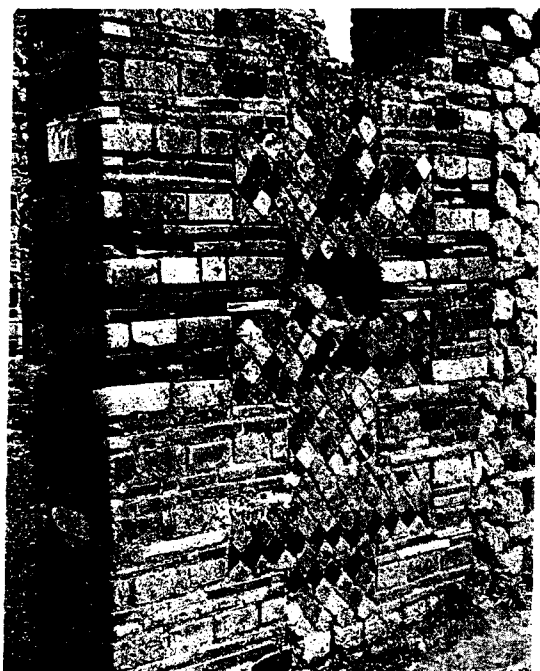
Photographs of Pompeii by J.-P. Adam

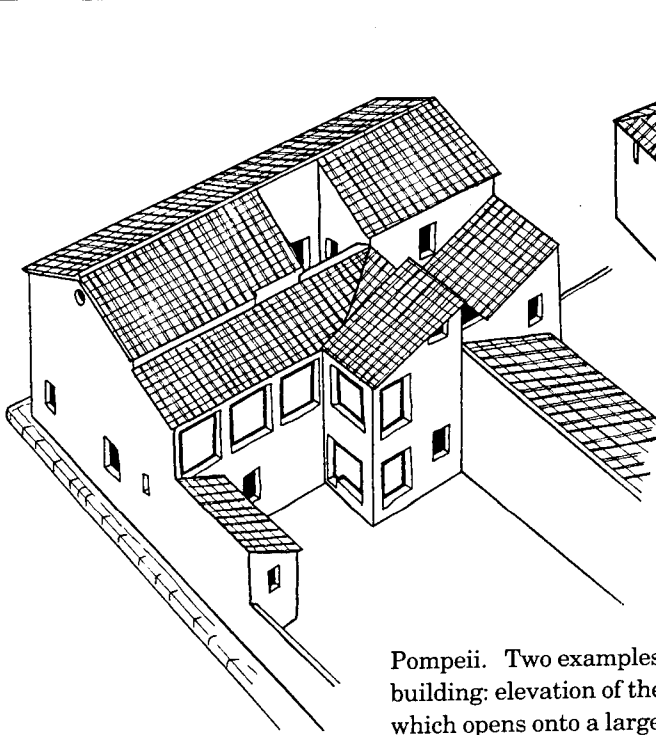


Opus Africanum

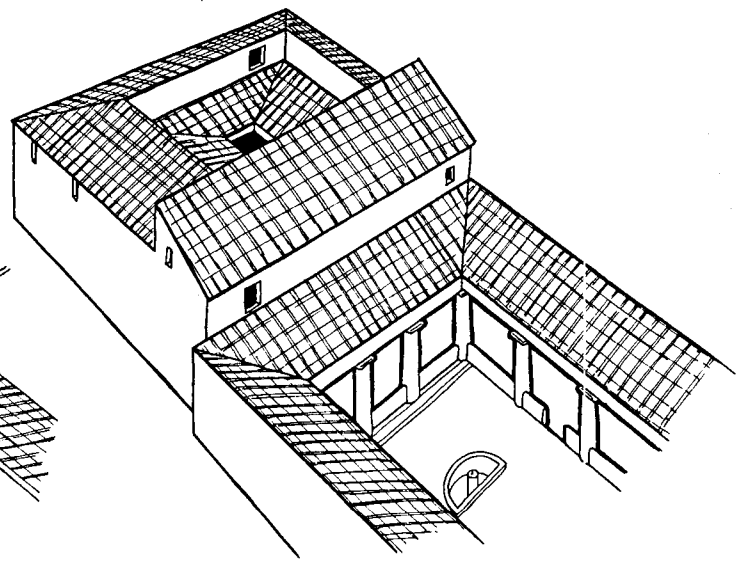
studies, particularly as regards fortifications in the large cities (Foss and Winfield 1986) and the religious architecture of the 6th to 9th centuries (Ruggieri 1991). These more recent studies have the merit of including historical aspects of architecture, and not just providing a description of monuments, as has traditionally been the case. However, even they lack a detailed consideration of building materials. The examination of mortars in the fortifications at Constantinople and mortars Nicea (these are the most exhaustive examples), which we find in the monograph by Foss and Winfield (1986), is limited in fact to a simple description of the exter-

Opus mixtum Opus reticulatum





Pompeii. Two examples of Roman private building: elevation of the House of the Moralist, which opens onto a large garden.



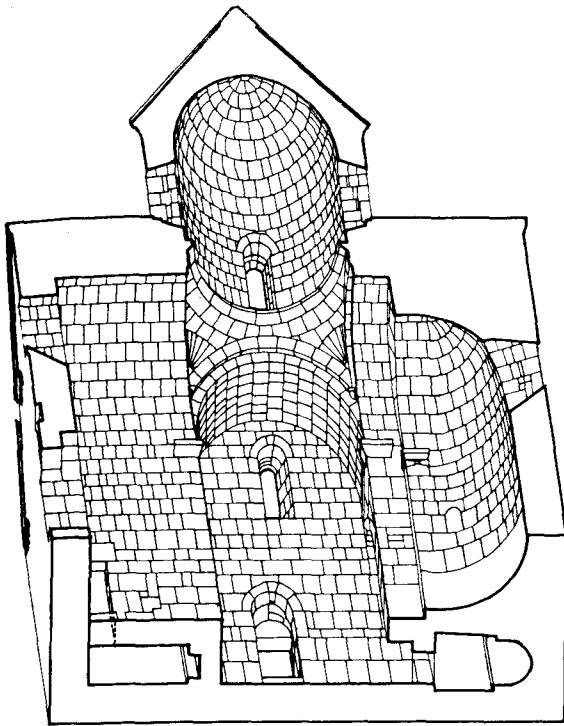
Elevation of the House of Trebius Valens in the Via dell'Abbondanza: a building for the wealthy (from Adam 1984).

no equivalent of "Pompeii"
in Byzantium

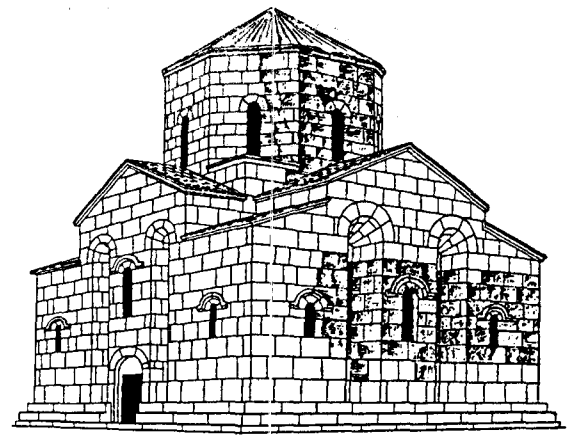
nal appearance of the material. We still lack satisfactory laboratory analyses of their content and chemical nature.

There are many cities whose substantial remains might qualify them to be considered as a sort of "Byzantine Pompeii"; but none of them has yet been thoroughly excavated and analysed like Pompeii. The uncovered remains of many towns and settlements could certainly be taken as clear evidence of this — one of the most striking examples being Apamea, where a Belgian archaeological team has been excavating for years. We cannot draw firm conclusions as to the nature of urban or rural settlements; and for many regions (e.g. Greece and Cyprus) there are few sources. But we have more information about Anatolia and Constantinople. Natural and historical conditions have obviously caused regional variations, but one practice which they have in common with other Mediterranean areas is that of reusing ancient monuments. Judging from the sources, however, there seems to have been a certain distinction between public buildings, which were built with more careful plans and better quality materials, and private buildings, which were generally of poor quality. Ruggieri (1991, p.147) has pointed out that ancient earthquake theories allowed Byzantine architects to make an empirical assessment of the degree of solidity and elasticity required in order to avoid the danger of collapse. But he also says that "we cannot, however, base our argument on another architectural factor, which is, how conscious the Byzantine architect was of the effect of the nature of the ground on the strength of foundations — although, if we can judge our architects by what they achieved, we must recognise a certain skill in finding the right place to lay their foundations".

Byzantine religious architecture makes particular use of brickwork for arches and vaults and, to a lesser extent and in bands, in the outside walls of buildings. It has been pointed out that in later times the bricks tended to become thinner and less compact. Overall, however, our general observations remain no more than conjecture, for, as Ruggieri (1991, p.183) points out, much more research needs to be done in relation to rural areas, where the growth of monasteries is characteristic.



Armenia. Axonometric projection of the church of St. Astvatzatzin (at the monastery of Sanahin, close to the frontier with Georgia). It was built in the year 934 by Armenian monks who had fled from Byzantium, and is the principal and oldest building in what was one of the most important monasteries in Armenia (from *Sanahin* 1980).



Armenia. The Aygesat complex (Echmiadzin region). Only ruins now survive of this ancient monastery, which may date to the 7th century A.D. The building was octagonal outside and cylindrical inside, with a hemispherical dome, enclosed in the customary way by a pyramidal construction (from Cuneo 1988). Such a very solid structure is frequently found in Armenia, and may have been intended to have an anti-seismic effect.

As far as Armenia is concerned, there are certain factors which make an investigation of building techniques difficult. Settlements were of a particular type (usually villages, with only a slight tendency towards urbanisation), invasions and consequent destruction were frequent, and the region was subject to intense seismicity. Cuneo's fundamental review of Armenian architecture (1988) shows that most research into such settlements as villages and fortresses consists of analyses of a historical and antiquarian kind; but we have better information about religious architecture. This is an area in which theories have been put forward suggesting that with certain types of monumental building, such as churches with a centralised plan and massively thick walls, "anti-seismic" measures had been taken — or at least measures designed to attenuate seismic effects. The solidity of these buildings was enhanced by the use of stone for cutting, whereas in Byzantine regions generally the use of bricks and mortar alternated with that of local stone.

We have substantial information about Italy from both written and archaeological sources. Thanks to careful historiographical work which is beginning to bear fruit and twenty years of medieval archaeology, we now know where building was going on in early medieval Italy, and what building systems were typical of inhabited areas.

It scarcely needs mentioning that the best investigated period is the late Middle Ages, partly because of the preservation needs of buildings which still stand. Nevertheless, there is information available about the early Middle Ages which is important for our purposes. We know that at the time of the Lombard invasion in the mid-6th century, two quite different areas of building began to appear in *Longobardia* and *Romania*, that is to say land ruled over first by the Lombards and then by the Franks on the one hand, and Byzantine territories on the other.

At an early stage, scattered rural settlements organised in farms became typical in *Longobardia*, the farm buildings being mostly of wood, which might be used with other simple materials such as reeds, straw and dry clay. Building methods re-

Buildings in Italy from the 6th to the 10th century

flected the need to make the most of materials which were available locally. Since there were substantial areas of forest, wood was obviously used a great deal, just as, in the inland areas of the Apennines, we find roughly hewn local stone being used.

wood and stone
in northern Italy

It is thought that wood was even more widely used in Lombard than in Roman times. It had the advantage that skilled labour was not required, since most peasants were skilled in carpentry amongst other things. As Galetti (1989) points out, buildings were sometimes constructed solely of wood, with posts which were linked vertically or horizontally and might rest either directly on the ground or on a low wall or planks. Or else the wood might provide a frame for walls made of dry clay or of clay and straw or of small stones. It appears from written sources that wood was also used as a roof covering (*scandolae*). Buildings of this kind were very practical and their constructional technique has persisted (houses of this type can still be seen in some parts of the Italian Alps) because they could easily be dismantled and their parts used on other sites when farming contracts expired (Galetti 1985).

As we have already pointed out, towns in the Lombard region had largely lost their position as power centres capable of exerting an influence over the surrounding area. They contained wretched dwellings made of wood and other low-grade materials, along with public and church buildings made of heavier materials such as stone, which was often spoliated from ancient buildings now serving as *in situ* quarries (Cagiano de Azevedo 1974; Ward-Perkins 1984).

In central and southern Italy, which was under Byzantine influence, even though there might be important Frankish territories here and there, we find special building techniques which differ in town and country. Typical of towns were concentrated housing areas consisting of single-storey dwellings with roofs of wooden planks (in the countryside as well as in the towns, houses begin to rise higher than a single storey only from the 12th century onwards: Toubert 1973). House walls were made of clay, or small stones and clay, or pieces of brick and mortar. Sometimes these materials were taken up as far as the main roof beam, and sometimes as far as the joists which formed the ground floor ceiling, the remainder being made of wood. Sometimes houses in towns used wood together with reused materials. We know about these things from excavations carried out within the inhabited urban areas of present-day towns.

But the most typical building in the Italian countryside during these centuries was the castle, which was not built *ex novo*, as in the north, but brought into being as an addition to pre-existing settlements (Settia 1976, 1979; Galetti 1989, with bibliography). This type of settlement was almost always built on high ground above the plain, either on rock or banks of clay or schist, and to this day it is a typical sight in the inhabited Italian countryside.

bricks, stone and tufa in
central and southern Italy

In central and southern Italy, the situation is different, in that more reused bricks are found, especially in the lower parts of buildings, while the upper parts would be made of tufa, which was lighter in weight and readily available in the region. In those areas where Byzantine territories (which subsequently acquired effective autonomy) persisted alongside Lombard territories, their different economies and labour systems resulted in the contemporaneous use of an interesting range of dif-

ferent building materials and techniques.

As far as Italy is concerned, there are also special considerations, for which we have documentary evidence, concerning the nature of buildings. Over very large areas, the wooden buildings of country settlements provided greater protection for their inhabitants from the effects of earthquakes (see Galetti 1989); and that lends force to the suggestion that the effects of large-scale seismic events were of much less importance than those resulting from raids, war or drought, all of which could undermine a person's life, destroy crops, and reduce means of subsistence to nothing, within an economic system in which agricultural output was very low.

In central and southern Italy, on the other hand (and in other areas as well, but less strikingly so), where there was a higher proportion of stone buildings, earthquake effects could be very destructive.

Islamic regions

There is a very substantial bibliography relating to the vast number of surviving Islamic buildings, especially as regards architectural and stylistic matters, but with rather less emphasis on building materials and construction techniques. The essay on the subject by Lewcock (1978) offers a comprehensive and well-documented survey of the whole subject. Lewcock reproduces a large number of miniatures which illustrate the work of stonecutters, masons, labourers and builders, with tools and various stages of building work: the preparation of mortars, the laying of stones or binding agents, the wooden scaffolding on building sites, the erection of domes, towers and so on — an extraordinary iconographic representation of a whole world of anonymous workers. There seems to be no equivalent in contemporary western culture for the attention paid by Arab culture to such aspects of human labour, and for us today these illustrations are very valuable evidence of building construction methods.

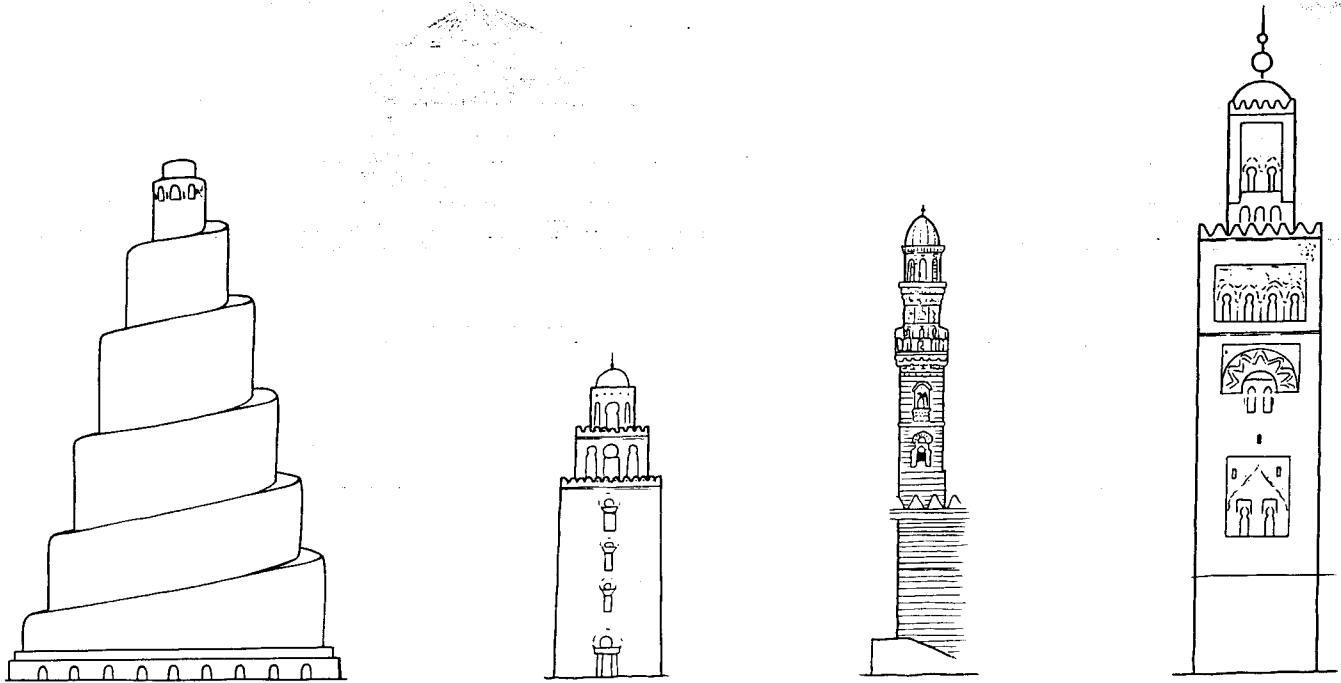
There are still sound stone buildings dating from the 8th to the 10th centuries in many Arab countries, but their characteristics vary according to region and period. Dressed stone was used for both constructional and decorative purposes. But what distinguishes buildings in Islamic regions, according to Lewcock, is the varied and imaginative use in a single piece of work of many different materials, such as stone, stucco, wood and brick. This made it possible to produce extraordinary chromatic effects. Not uncommonly, wood formed an integral part of a building, whether a private house or even a mosque. It is perhaps of interest to note here that Vitruvius' treatise was not translated into Arabic, though many other Greek and Latin writers were. The earliest work which we can identify as a building construction manual dates to the 8th century (of the Christian Era), and was written by Rashid al-Din, who came from the region of Iran. Other manuscripts to which Lewcock draws attention are of much later date.

stone, stucco,
wood and brick

From the 7th century to the Abbasid period it was common practice to reuse dressed stone columns from earlier buildings and cover them with stucco.

Another general aspect of Islamic building work that we have to take into account is foundations. They were usually made of stone, and were embedded 50 cm into the ground in the case of a "poor" building and up to 11 m in the case of certain special buildings (such as Gunbad-i-Qābūs, built near Gorgan in 1007). Where stone was rare and expensive, lime mortars were used in foundations, and also at the

stone sizes



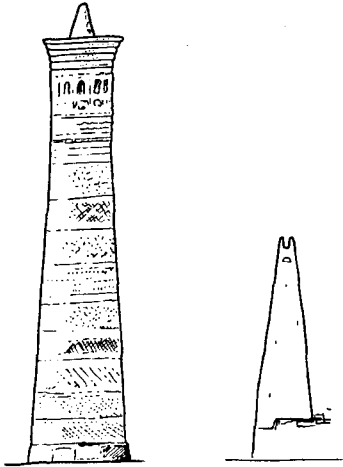
corners of buildings, to strengthen them. Lewcock (1978, p.135) says that "gypsum mortar was then used for pointing the joints of face stonework or brickwork, in which case the mortar of the inner faces and cores of walls was seldom more than a local clay grout, occasionally mixed with chaff or straw".

arches It has also been found that there was a custom — probably of Byzantine origin — of constructing the ground floor of a building in stone, including the flooring itself on occasion, and then changing to brick for the upper floors (there are some 8th century sites in Syria where this occurs). Another key element in building construction in Islamic regions is the pointed arch. Arches had previously been built "with wooden tie-rods, as though the architects were unsure of the strength of their construction. Such a practice", says Lewcock, "may have been simply the logical extension of a system of timber reinforcement, common in pre-Islamic times [...] even in stone structures it served to strengthen high buildings and to resist settlement due to poor foundations and earthquakes" (p.136). This is particularly evident in 7th and 8th century buildings in Cairo.

bricks The use of bricks in Islamic regions is of Romano-Byzantine and Sassanid origin. Both types of brick were square, the Roman type being 4 cm thick and the Sassanid 10 cm thick. The width varied between 20 and 17 cm, according to the region and period. The common mortars used in laying bricks are a mud-straw mixture in the case of sun-dried bricks, and gypsum for kiln-fired bricks, except in exposed or damp conditions, when a lime-sand mortar is employed.

Minarets are a particular aspect of buildings which is very frequently mentioned in Arab sources for the damage they suffered in earthquakes. Their form is that of a tower on a square base, with few constructional variations. The upper parts might be octagonal and then cylindrical, or simply octagonal, or the cylindrical and rectangular parts might be in different proportions.

The stability of tall minarets was achieved, according to Lewcock (1978, p.143) "not merely by the system of superimposed storeys of decreasing size, but also by the use of the staircase construction to tie the outer skin of each minaret to its central core". Minarets could sometimes reach a height of 70 m. Buildings of this type are often mentioned in Arabic sources as having suffered earthquake damage.



Some minaret types
found in the Mediterranean area (from Golvin 1970).

Our knowledge of the ideas of the natural philosophers, together with what we know about ancient building techniques, inevitably prompt the question: was there an “anti-seismic” culture in the ancient world? To what extent were the ancients aware that certain building procedures could mitigate the effects of earthquakes? It is surely no easy matter to provide an answer to that question, in our present state of knowledge. The particular frequency of earthquakes in certain areas of the Mediterranean may well have encouraged the use of certain practices amongst ancient architects. The system most likely to have been adopted was that of wooden rods connecting the sections of columns. The elasticity of the vertical structure that was obtained in this way could in practice mitigate the effects of the lateral movement caused by seismic shocks for a considerable period of time. But columns made in sections almost certainly became popular because of the comparative ease with which the materials could be found and transported, not because of their behaviour in earthquakes. The practice of using rods resulted from the need to provide the structure with a secure vertical alignment. Recent research into ancient structures has shown that seismic damage is largely the result of the close interaction between ground and structure — a relationship which becomes operative at the moment of oscillation and therefore, in the final analysis, governs the reaction of the structure itself. This approach has recently been adopted for certain monuments in Rome, such as the Colosseum and the Antonine Column (see Funicello *et al.* 1992).

To what extent the ancient world was conscious of this behaviour, it is difficult to say; but we cannot exclude the possibility that in some cases the empirical methods of ancient builders — who adopted trial and error procedures since they lacked suitable mathematical means for making constructional calculations — produced at least some positive results in relation to earthquakes. These theories do not appear to have been subject to further elaboration during the late Hellenistic and Roman periods. Seneca’s treatise, which sums up the trends we have noted so far, takes us as far as the theories go. That does not mean, however, that these theoretical concepts were not given practical application. Nevertheless, it was Aristotle’s theory, elaborated in one way or another, which remained the basis for

Was there an
anti-seismic culture?

a problem to be
approached without
modernist prejudices

remained the basis for ancient and medieval interpretations of earthquakes. One is certainly entitled to ask whether these theoretical views of earthquakes had repercussions on a practical level. There are some clues in Pliny the Elder (*n.h.* 2.197) concerning resistance of vaults, and the presumed ability of wells and hollow subterranean places to mitigate seismic effects. Adam (1989 c) wonders whether the decision to build with ashlar masonry was the result of a desire to achieve strength and visual attractiveness, or rather maximum stability in an earthquake. He thinks it likely that all these considerations were involved, but is unable to detect any clear preference. It is at least certain that the seismicity of Campania was known, and that builders had probably had an opportunity to observe that large stone blocks of *opus quadratum* were far more resistant to earthquake tremors than rough and ready constructions, or walls held together with clay mortar. It is indeed the case that if large stone blocks have skilfully cut adjoining surfaces, there is a large area of surface contact, which means that they absorb a large part of the movement involved in friction between them, and hence attenuate destructive energy, at least in the case of earthquakes with effects up to VIII on the MCS scale. Indeed, a study of the damage caused by the earthquake of 62 A.D. shows that while damage to stonework of any period was considerable, limestone and tufa façades, on the whole, stood up to the shocks well. If this kind of quality building later ceased to be used for private houses, it was for practical and economic reasons rather than reasons of building technique.

There is an anecdote in Agathias about Anthemius of Tralles, the architect of Santa Sophia, who apparently used steam to simulate an earthquake (see Traina 1989 c, pp.186-91), and this shows how the *pneuma* theory had its effect on the thinking of architects. Agathias (5.7-8) tells how Anthemius, who lived immediately below Zeno, erected a system of cauldrons and pipes in his home in such a way that a head of steam could be made to shake the floor of Zeno's room. When he put this apparatus into operation, Zeno and his friends were so terrified by the shaking, thinking it was caused by an earthquake, that they rushed out into the street. There were those who claimed, says Agathias, that Anthemius had achieved a similar effect to an earthquake by reproducing what actually happens in nature.

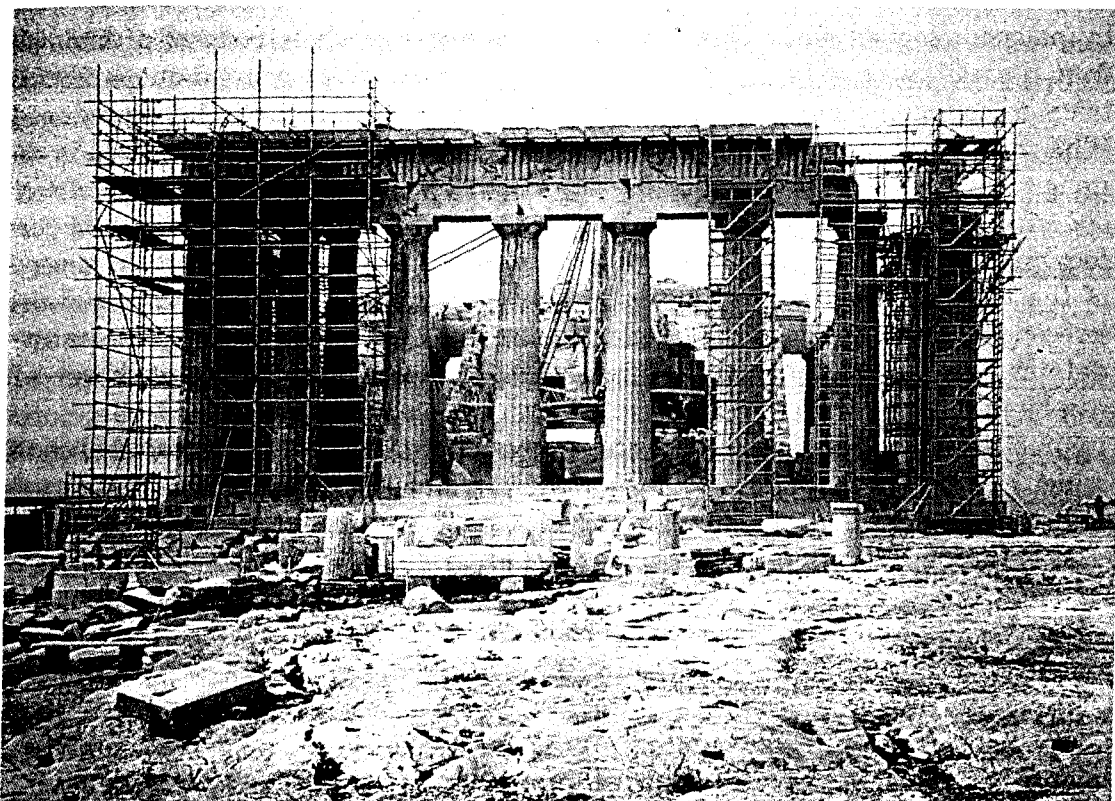
From a theoretical point of view, this interpretation does not take us much further than the central nucleus of the Aristotelian *pneuma* theory. Anthemius did not have to rack his brains very hard to play this trick on his rival; for Ctesibius (3rd century B.C.) and Hero (1st century A.D.) had already made full use of steam power, and Roman engineers had used similar devices in theatrical performances in order to obtain spectacular scenic effects. But it is surprising nevertheless to see how Justinian's architect succeeded in simulating an earthquake. It was one thing for a theatrical effect to be observed by an audience which was aware of the trickery involved, and quite another to succeed in creating something which was genuinely mistaken for an earthquake. We do not believe, however, that his device was capable of practical application in architecture. If Anthemius had lived long enough, he would have seen his own *magnum opus*, Santa Sophia, collapse in 557, precisely as a result of an earthquake.

Briggs (1962, p.430) has interpreted the practice of inserting wooden joints into

wells and tunnels

opus quadratum
and seismic resistance

theories and
practical application



Athens: a recent photograph of the Parthenon supported by shoring. The behaviour of large ancient architectural structures during earthquakes is a research problem arousing much interest at the moment. It is in the area of new engineering studies that it may be possible to discover anti-seismic techniques "consciously" adopted by ancient builders (photo Stiros).

walls and beams into the arches above pulvins as antiseismic measures.

A separate problem is the analysis of any technical devices adopted during the Middle Ages which might still survive in the practical know-how of local skilled workers. The European University Center at Ravello (Italy) has for some years been carrying out research into what are known as "local Mediterranean seismic cultures", and while a number of problems have been identified but not solved, certain new possibilities have opened up. The hypothesis that devices such as the tothing of load-bearing walls and the use of special joints in wooden floors etc. may have existed in minor civil buildings in the Mediterranean area isolates the problem from theoretical concerns and opens up research possibilities within certain "historical" building cultures which can still be observed today. This approach may have important repercussions for the recovery and restoration of such buildings, using historical techniques for which the necessary skills can still be found at local level (there have been some attempts to do this in the area of the Irpinia-southern Italy earthquake of 1980, see Ferrigni 1989).

local seismic cultures

The remains of ancient buildings and seismic archaeology

Establishing where an ancient earthquake occurred when no precise data are available is not so very different from carrying out those "mental operations" used

by palaeontologists when they are reconstructing the whole body of a dinosaur from a small piece of bone. As epistemologists have often pointed out, and contrary to common belief, science often uses what cannot actually be reproduced. When aspects of reality which are not directly definable need to be recreated in the imagination, scientific and historical reconstructions share a certain degree of *non-objectivity*, making up for missing data in a similar way. An appreciation of that fact brings the two points of view closer together and smooths out certain aspects of the historical and scientific disciplines which might otherwise be considered irreconcilable (one thinks of the clash between "qualitative" and "quantitative" data and its repercussions in the historiographical field as well as elsewhere). It can be justifiable, therefore, to describe a phenomenon of scientific interest in the imprecise terms of outdated means of expression formulated within cultural codes which are not totally understood. Decipherment of these codes not only allows us to establish certain parameters (delimiting where and when), but in particular to assess the importance of echoes of seismic phenomena embedded in the cultures and learning of the past. What this procedure actually achieves is probably simply to shed light on relationships, on the *whys* and *wherefores* which link the few empirical data available and those which have been posited.

working by conjecture

The real testing ground for the use of conjecture as a working method is archaeology, for here we have involuntary sources, and the chance preservation of fragments of the material world. Can we find any traces of seismic activity? Can we get to grips with the problems of seismology in a practical way by examining these chance fragments of the inhabited world? We need archaeology not solely or principally to establish the part played by a strong earthquake at a particular site or in the history of a building (though such data are indeed interesting for the economic and social history of the region concerned), but rather to establish exactly where seismic effects were felt in a particular area. Perhaps the ground at an ancient site may preserve traces of seismic activity about which we currently know nothing; or perhaps it may conceal a geological situation in which the vibrations produced by seismic events, even though perhaps originating at a great distance, are amplified or at any rate propagated in an effective way. There is no doubt at all that if archaeology is brought to bear on these problems, it can be a useful instrument for helping us to understand local reactions to seismic events.

In the Italian edition of this catalogue (Guidoboni 1989) we tried to establish in what situations and using what methods archaeologists think they can identify seismic effects, what the indicators are, and how they arrive at their conclusions about the existence and date of seismic effects. These questions needed to be asked, because there might be cases where such conclusions can be set out without the support of an explicit methodological approach. Yet they may risk being uncritically reflected in seismological research. When the identification of such real or presumed seismic effects passes from one discipline to another, it acquires a sort of authority through the sole fact that it belongs to a scientific discipline which is foreign to the person using the information; and that person may obviously not always be aware of the methods and interpretative rules which ought to lie behind it. Various studies by archaeologists were included in the Italian edition of the catalogue. On the one hand, there was a many-sided debate as to how far archaeology

could be used by seismology as a source of information; and on the other, there were reports of a number of excavations with the conclusions to be drawn from them.

In the four years that have elapsed since then, no substantial improvements in methodology have taken place. The subject has nearly become fashionable, and might attract the attention of archaeologists without arousing particular interest in methodological problems. What is important is to work within the framework of scientific disciplines (engineering, seismology, palaeoseismology and geology, for example) which can supply quantitative assessments as well as other data.

planning new
multidisciplinary research

In our opinion, then, the aim of seismic archaeology in the immediate future should be to break away from "personal" and often unverifiable observations about supposed seismic effects, to become an instrument for identifying further historical earthquakes, and to bring the analyses of structural engineers, the data provided by seismology and the considerations of historians within the scope of archaeology. We need to abandon the field of pure archaeology and enter the multidisciplinary field of seismic archaeology. It is likely that advances of this kind would involve high research costs, and the benefits might be few; but these are problems which ought to be debated, and an assessment should be made as to the suitability of following that road. Even if it is not possible to deal with these matters in a wholly satisfactory way, there are a number of contributions which could be made. For example, critical case histories could be drawn up concerning earthquake damage to surviving historical buildings, or research could be conducted to examine collapses and their causes in archaeology. The causes, we all know, are many, and it is not easy to distinguish between them: invasive vegetation which has since disappeared, the wind, decay, the progressive spoliation of building materials, etc. If an atlas were structured in this way, it could help, in our opinion, to clarify some ideas and to provide empirical data, of which we have so far only a rather muddled collection.

The quantitative assessment of ancient earthquake effects

While the dynamic characteristics of seismic activity are substantially stable over a long period of human time, there is variation in everything we find on the earth's surface: the form of inhabited area networks, the characteristics and morphology of inhabited sites, house types, the quality of building materials, the state of preservation of buildings, and population density. When seismic history is concerned with the analysis of a long period of time, it must take historical variables of this kind into account, for they have been and still are matters pertaining to seismic zones. But this is scarcely ever taken into consideration in seismological circles; and to raise the matter now is to cast doubt on the present use of macroseismic scales. Let us see why.

In order to make comparisons between earthquakes in different places, an apparently simple conceptual instrument was devised in the second half of the 19th century, and is still rightly used today: the *intensity of effects scale*. It allows a particular degree of intensity (from one to ten or twelve, depending on the scale used) to be attributed to the seismic effects observed in the various localities struck by an

earthquake, and it relates to a series of qualitative factors which, in the opinion of the inventors of the scales, reflect specific seismic effects (on people, buildings and the ground). These summary "pictures" of seismic effects are arranged along a discrete (i.e. discontinuous) scale, ranging from the slightest to the most destructive. Evaluations of this kind have permitted considerable advances in the field of seismology. For by applying a fixed qualitative criterion to the evaluation of seismic effects, it was possible to identify areas with similar effects. The aim was to use the image of the way the earthquake's effects were propagated in order to identify its "source area".

Today we know that this propagation may be complicated by local geological factors, causing the maximum effect to be found many kilometres from the earthquake's epicentre. We thus need more than just descriptive data if we wish to understand historical earthquakes: we need to cooperate with geophysicists and geologists in order to identify seismogenic structures. For our present purposes, however, it is sufficient to make the following points:

- 1) macroseismic scales were not drawn up in order to classify historical earthquakes, but to classify earthquakes as they occurred, with effects that could be directly observed *in situ*;
- 2) intensity scales began to be systematically applied to historical earthquakes in the second half of the 20th century, at a time when the learned tradition which had made it possible to collect historical data had been lost, and seismology had become more and more instrumental seismology;
- 3) the parameters used for instrumental catalogues were also applied to historical earthquakes, without any particular forethought or strategy, in a rather naive but very understandable attempt to broaden the chronological base and compare more data from different times. The importance of such data was emphasised by the European Seismological Commission at its meeting in Stuttgart in 1952, when it encouraged the compilation of national catalogues of historical earthquakes. However, the Commission did not itself offer a methodological orientation which would make possible a dialogue between the various branches of learning (and these were not times when multidisciplinary research was a real prospect). Until the early 1980s, in fact, specialisation had a limiting effect on such a notion in the scientific world of seismology.

Some scales have been revised in more recent times (e.g. the Medvedev-Sponheuer-Kárník scale, MSK — see Grünthal 1993), and take into account the type of damage in its relation to the type of dwelling, where recent buildings are concerned. That makes it possible to establish an overall picture of current seismic effects in relation to specific building characteristics — something which data from instruments obviously cannot supply, for they can only allow us to deduce earth acceleration characteristics and source mechanisms. As far as seismic effects are concerned, operative factors include not only building construction methods and the quality of building materials, but also the nature and state of preservation of buildings; for it is the sum of these factors which defines the vulnerability of the buildings concerned.

Seismic effects in the past, as in the present, are obviously determined both by what we may consider stable factors (those characteristics which relate to the

physical phenomenon at its source, i.e. geology and surface topography) and also by factors relating to historical variables, such as the nature and vulnerability of buildings, referred to above. If we assume, then, that seismic activity and surface geology are more or less unchanging, it must be historical living conditions and changes to those conditions which affect the intensity value.

We may well ask, therefore, what, in the long term, is the relationship between natural seismicity and seismic effects, taking that relationship to depend on the interrelation between the natural characteristics of an area and the culture of those who have inhabited it.

In our opinion, it is not always possible to establish some sort of intensity value on the basis of a few meagre and generic pieces of information, and in relation to buildings about whose material characteristics very little is known. The uncritical use of a macroseismic scale can encourage estimates whose accuracy is an illusion. We have chosen to not calculate derived parameters like magnitude, depth etc.; we have preferred to attempt an evaluation of seismic effects only in those cases where descriptive elements in the sources allowed us to identify a typology of impact in some way similar to that attached to the various degrees on the scale. We have provided a schematic cartographic representation of the felt area in those cases where the most reliable sources mention at least three locations.

The problem lies not only in the sources' limitations, but also in the scanty information available about living conditions, inhabited area networks, the nature — in the broadest sense — of the area involved, overall economic levels and life styles. Moreover, the fact remains that historical information often relates mostly to large cities, since they were centres of culture as well as of political and territorial power. The monasteries, however, had their *scriptoria*, which were busy recording important contemporary events in chronicles and annals, and so modifying the traditional point of view to some extent, by leaving us evidence of events involving villages and isolated small towns — that is to say, places beyond the urban context. These various points of view have a determining influence on our understanding of the seismicity of the past. In the short catalogue which we have drawn up (see below), these problems are emphasised rather than just stated.

We think that sophisticated linguistic analyses, new archaeological techniques and a more precise understanding of building construction techniques will in the future be allied both to new factors concerning the seismotectonic dynamics of the areas under examination, and to the results of extended geomorphological investigations aimed at identifying the seismogenetic geological structures of seismic events. In our opinion, all these data, when taken together, will be able to illuminate many dark places and lead it to a more intelligent quantitative assessment of seismic effects. That is why we maintain that the value of basic historical data lies in their permanence.

retaining the value
of historical data

It is our interpretation of them which will have to change.

**contributors to this
edition of the catalogue**

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Hebrew sources	Giulio Busi
Greek sources	Giusto Traina and Antonio Rigo
Latin sources	Alberto Comastri, Giusto Traina and Costantino Marmo
Armenian sources	Giusto Traina
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Catalogue

The Mediterranean in earliest times: limits of present-day knowledge and limits of the sources

There is an established tradition in historical seismology concerning certain earthquakes in ancient Egypt, as one can see in studies ranging from von Hoff (1840) and Mallet (1853) to Sieberg (1932 a, b) and, more recently, Maamoun *et al.* (1984) and Kebeasy (1990). But these studies do not all adopt the same approach. In the older catalogues, the information used was provided with references (confused though they might sometimes be) to specific sources (unfortunately there is no mention of earthquakes in pre-Christian Egypt); whereas more recent works not only cover a more extensive time-span, but provide an assessment of the earthquakes — even in terms of intensity and magnitude — without any reference to the sources on which the catalogue data are based. This practice has led to the uncritical acceptance of such data and its persistence up to the present day in all its imprecision. What has been lacking in the past, and is still lacking today, is an investigation into the written sources supposedly underlying the tradition established in historical seismology, as well as into the great number of available sources for ancient Egypt. For the purposes of our catalogue, it is necessary to carry out a preliminary analysis of the data on ancient Egypt found in earthquake catalogues, if only to assess the state of our knowledge concerning one of the most important Mediterranean countries in ancient times. We have felt it necessary to explain why our series of catalogue entries does not begin with earthquakes in ancient Egypt, as might have been expected, in view of both the early date of the sources and the fact that a seismological tradition places the first earthquake in Egypt, and hence in the Mediterranean, in the 23rd century B.C.

Ancient Egyptian
sources

We have taken the most recent studies which provide a historical sequence of earthquakes (Maamoun *et al.* 1984 and Kebeasy 1990), and analysed the five earliest earthquakes from pre-Christian times, namely those dated to 2220, 1210, 600, 221 and 28 or 27 B.C. We are told that there is documentary evidence for these earthquakes “in the annals of ancient Egyptian history” (Kebeasy 1990, p.51); but from an Egyptological point of view, it is very difficult to check the reliability of sources referred to in such general terms and without any information at all as to their nature.

Furthermore, we have to take into account the stylistic register of descriptions of earthquakes in Egyptian texts; for all the descriptions we have traced, in a rapid review of known occurrences of ancient Egyptian words for earthquake, have a rhetorical rather than a historical context. The subject first appears in the Pyramid Texts, which are a collection of ritual formulae, incantations and mythological texts written on the walls of pyramid burial chambers from the second half of the 3rd millennium B.C. onwards. As is also the case in later texts, earthquakes are interpreted here as a phenomenon accompanying the ascent of a dead pharaoh, a manifestation of the divine presence, or an expression of divine anger.

rhetorical contexts

The Egyptian vocabulary known to us contains at least five different expressions for seismic phenomena (Erman and Grapow 1957, II, p.81.5-8; pp.222.9-223.1; IV, p.366.9; V, p.146.2; see also the table of languages in this catalogue, p.407). This fact bears eloquent testimony to the considerable sensitivity of the ancient Egyptians to earthquake shocks, though perhaps they had no experience of actual seismic disasters. Clearly, it would be necessary to carry out a systematic and specialised examination of Egyptian texts in order to acquire a scientific basis on which to review the historical problem of earthquakes in ancient Egypt.

The seismological tradition dates the earliest earthquake in Egypt to the 23th century

B.C. It is supposed to have occurred in the Nile valley and to have struck the ancient city of Bubastis (present-day Tell Basta in the province of Sharqiya, in the eastern Delta). The few texts of the period, however, have nothing to say about it. Earthquake catalogues speak of "deep fissures and lesions in the ground of the region, datable to the reign of king Akhtoes of the 10th dynasty" (Maamoun *et al.* 1984 and Kebeasy 1990). The name Akhtoes is a Greek form of the Egyptian Khety — a name borne by many kings of the 9th and 10th dynasties — and is used by the Egyptian priest Manetho in his 3rd century B.C. history of ancient Egypt. Only brief extracts of his work have survived, however, in later historical works. The chronology accepted by most Egyptologists nowadays places these kings between the second half of the 22nd century B.C. and the mid-21st century B.C. This modifies Sieberg's (1932 a) dating only slightly, but the date 2800 B.C. given by Kebeasy (1990) for the same earthquake must be wrong. However, no surviving text which can be dated to this period mentions earthquakes or contains descriptions of chasms or fissures opening up in the ground at ancient Bubastis, nor is there any archaeological evidence to support the hypothesis. There is a literary text, known as the *Prophecy of Neferty*, which can be dated to the early 20th century B.C., and which describes the apocalyptic effects of a catastrophe which apparently struck the whole of Egypt at the beginning of the 10th dynasty. The description of the event, however, seems more appropriate to the dramatic effects of long drought than to an earthquake:

[...] Lo, the great no longer rule the land,
what was made has been unmade,
Re should begin to recreate!
The land is quite perished, no remnant is left,
not the black of a nail is spared from its fate.
[...] The sundisk, covered, shines not for people to see,
one cannot live when clouds conceal,
all are numb from lack of it.

I shall describe what is before me,
I do not foretell what does not come:
dry is the river of Egypt,
one crosses the water on foot;
one seeks water for ships to sail on,
its course having turned into shoreland.
Shoreland will turn into water,
watercourse back into shoreland.

Even the natural calamity theme is not necessarily realistic, for the *Prophecy* is a work of propaganda from the 12th dynasty, and belongs to a long tradition of messianic texts which made use of the theme of unhappiness and misfortunes in the "present" with a view to announcing the arrival of a saviour, who is in this case the founder of the new dynasty. Data on historical earthquakes in ancient Egypt have been transmitted uncritically from catalogue to catalogue, perhaps beginning with old Egyptological publications. We therefore cannot exclude the possibility that behind this information about the first earthquake there lies a mistaken interpretation of a messianic text such as the *Prophecy of Neferty*; and the connection with Bubastis is made apparent by the fact that the author of the prophecy is a priest of the goddess from that city.

archaeological sources

The second earthquake recorded in the catalogues is that of 1210 B.C. in Upper Egypt, but an examination confirms our opinion that a thorough analysis of the written sources and — in this case — archaeological sources as well, is required. The earthquake is supposed to have damaged the colossi on the façade of the rock temple of Ramesses II at Abu Simbel, thereby necessitating the repairs carried out by Sethos II (Maamoun *et al.* 1984). But the cause of the damage actually suffered by the temple has in any case been put in doubt by the scholars who have revised the work of Sieberg (Maamoun *et al.* 1984; Kebeasy 1990).

Of the five earliest earthquakes listed in the catalogues, this is the only one which can be specifically checked, since we have sources in the form of the building itself and some texts there inscribed. The Great Temple of Abu Simbel in Egyptian Nubia was built by Ramesses II, who ordered it to be carved out of a cliff on the river bank. It is well known that in the mid-sixties of this century, a grandiose international scheme

was set up under the auspices of UNESCO to save the temple from being submerged by the waters of the lake created when the high Aswan Dam was built. The temple was dismantled and rebuilt on the edge of the lake. The work of the archaeologists and engineers involved in documenting and protecting the temple has provided a mass of very interesting information about its history. Only a few years after it was completed — perhaps while Ramesses II was still on the throne — it suffered a series of collapses and lesions, involving in particular the more fragile parts of the building, that is to say the pillars in the great hall and the colossal statues of the king on the façade, with the result that the pharaoh's architects were obliged to carry out a series of repairs. In spite of technical reports on the damage, doubts remain as to its cause: were dynamic natural phenomena responsible, or was there subsidence caused by the poor quality of the sandstone out of which the temple was carved? On the whole, the experts are inclined to favour the second explanation (Christophe 1970, p.259). That an earthquake was not responsible is confirmed by the fact that a series of substantial fissures and disturbances has been found to have occurred in the years *preceding* the moving of the temple: fresh cracks appeared in the pillared hall, worrying cracks appeared in the façade, fragments of architectural elements collapsed, as well as slabs of rock. The Belgian architect and Egyptologist, Christophe, who was actively involved in the work of studying and protecting the temple, declared that "the great temple of Abu Simbel was bound to suffer total or partial collapse sooner or later" (Christophe 1970, p.261). Furthermore, the hieroglyphic texts which the architects responsible for the repairs had written on the repaired parts make no mention of earthquakes or other natural disasters: the wall built to support a damaged pillar bears a copy of the text of the "Blessing of Ptah", which has been dated to year 35 in the reign of Ramesses II (Kitchen 1971, II, pp.258-81; but the text on the wall may have been engraved later). In the case of the first colossus to the north of the doorway, the names and epithets of Amenmesses have simply been written on the brick blocking supporting the statue's arm. Amenmesses was probably responsible for the repairs. He ascended the throne on the death of Merenptah in 1214 B.C., and his reign was troubled by dynastic quarrels with Sethos II (Kitchen 1971, II, pp.751-4). The above-mentioned text was in fact usurped by Sethos II, who had his own titles engraved over those of Amenmesses (Habachi 1978). If the collapses were indeed caused by an earthquake, it is astonishing that the sources should make no mention of it, especially in a culture which saw earthquakes as having a divine dimension. An analysis of the available archaeological information, taken together with the evidence provided by the hieroglyphic texts, thus seems to substantiate the doubts already expressed by seismologists as to the reality of the earthquake disaster which is supposed to have struck Abu Simbel, and suggests that it should be eliminated from lists of historical earthquakes.

The third earthquake recorded for ancient Egypt appears in Sieberg (1932 a) and is re-examined by Maamoun *et al.* (1984). It apparently occurred around 600 B.C., was felt in the region of Thebes in Upper Egypt, took place shortly before an eclipse of the sun observed by Thales (28 May 585 B.C.), and struck "the fortress where the Chaldeans had their camp with such violence that it caused them to return home" (Maamoun *et al.* 1984). The information presented in the catalogues is convincing from a chronological point of view, but there are two factors which prevent us from including it in our catalogue:

- 1) an analysis of the historical and geographical context;
- 2) the lack of sources — at least as far as we are aware — to confirm its occurrence.

As regards the first point, it is difficult to accept the suggestion made by Maamoun *et al.* (1984) that the region involved was that of Thebes. The fact is that the closing years of the 7th century B.C. and the early years of the 6th century saw the outbreak of hostilities between Egypt and the Chaldeans (i.e. the neo-Babylonian empire),

brought about firstly by the vigorous activities of Necho II (610-595 B.C.) and continuing, later on, during the reign of Psammetichus II (595-589 B.C.), son of Necho, and his successor, Apries (589-570 B.C.). At no stage in the conflict, however, did the Chaldeans succeed in entering Egypt, much less advance as far as Thebes, for they were always brought to a halt on the eastern frontier of the Delta by the Egyptian army. If, therefore, an earthquake really did strike the fortress where the Chaldeans were in camp, the place where this happened should be sought in Palestine rather than Egypt.

As for the question of sources, it must be pointed out that although there are numerous historical sources for the war between Egypt and Babylon at that period (Egyptian texts, Babylonian chronicles, various books of the Bible, and classical histories such as those of Herodotus, Josephus etc.), none of them mentions this earthquake, though it came at such a convenient moment for the Egyptians. It is also the case that ancient Egyptian texts do not provide any information about the two earthquakes which are supposed to have occurred respectively in 221 B.C. (striking the Siwa Oasis and other places in the Libyan desert) and 27 B.C., the latter being responsible for the damage which is supposed to have caused one of the two colossal statues of Amenophis III at Thebes (better known as the "Colossi of Memnon") to "sing" at dawn.

Earthquakes in the Hebrew Bible The commonest term for earthquake in Hebrew is *ra'ash*. It appears 47 times in the Old Testament: in 30 cases as a verb and in 17 as a noun. The phonetically similar root *ragaz* is also used, but less frequently. There are 11 passages in the Bible where verb forms deriving from *ragaz* occur in relation to earthquakes, and one instance of a substantival form. Even less commonly does one find the roots *ga'as* (to shake, quake: *2 Sam.* 22.8 and *Psalms* 18.8) and *ra'ad* (to tremble, quake: *Psalms* 104.32).

References to earthquakes and related phenomena in the Hebrew Bible undoubtedly spring from direct experience of real events, but in most cases the experience is deprived of its historical dimension and given a religious perspective. In other words, the earthquake becomes part of the theophany of Yahweh: it is one of the ways in which the God of Israel makes himself manifest.

If we are to understand the particular way in which this conception of earthquakes is applied in the Hebrew Bible, we must first identify the cultural background of the authors concerned. In the ancient tradition of the Near East, earthquakes were interpreted as an expression of invisible forces — a manifestation of hidden power — and as such were integrated into the complex network of magic relationships which were seen as underlying physical reality. It is well known that, in the magic interpretation of things, there is complex system of relationships between "low" and "high", the world of the senses and that beyond the senses, the visible and invisible, earth and heaven; and within this magic framework, earthquakes have their rightful position. Indeed, earthquakes and other extraordinary natural phenomena have a particularly important part to play within the magic code; for events which, like earthquakes, disturb the regular behaviour of nature, carry a particular message, by providing a higher and more intense level of communication between man and the physical and cultural surroundings in which he lives. In the magic scheme of things, earthquakes are indicative of a breakdown in the equilibrium of the physical world, and magic intervention is necessary to re-establish that equilibrium, without which man cannot survive. Earthquakes bring disorder into the fabric of man's daily existence; and the aim of magic is to identify the consequences of what has happened, either by predicting further disasters, or by taking action to restore order to nature and life. It is considerations of this magic kind which underlie the common view in Mesopotamian circles that earthquakes and exceptional celestial phenomena could alike foreshadow future events. Just as monstrous births were a magic warning of the future destiny of individuals and communities, so earthquakes, thunder and floods were indicative of

cosmic "disorder"; and it was the function of the magician to foresee, and if possible to forestall, their dire consequences (Bottero 1985).

These beliefs are found throughout the ancient Near East, and they underlie the Hebrew Scriptures; but the authors concerned have a particular way of trying to adapt these magic elements to the structure of their own religious thought. Thus, in the pages of the Bible, emphasis shifts from the symbolic system of magic to that of the will and actions of God. In the case of earthquakes, the phenomenon is seen, not as a sign of severe cosmic disturbance, but as a direct manifestation of Yahweh: of his moods, and his intervention in the worldly affairs of the chosen people. The shaking of the earth is interpreted in particular as announcing either the presence of the Lord or his wrath.

The first of these two ideas is stressed in certain passages of *Psalms*, which provide a detailed description of natural phenomena accompanying the presence of the *numen*. Thus, in *Psalms* 68.8-9 (EVV. 7-8): "O God, when thou didst go forth before thy people, marching across the wilderness, earth trembled, the very heavens quaked before God".

אלהים בצאתך לפני עמך בצעדך בישימון סלה ארץ רעשה אף-ישמים נטפו מפני אלהים.

And in *Psalms* 77.14-21 (EVV. 13-20): "O God, thy way is holy; what god is so great as our God? Thou art the God who workest miracles; thou hast shown the nations thy power. With thy strong arm thou didst redeem thy people, the sons of Jacob and Joseph. The waters saw thee, O God, they saw thee and writhed in anguish; the ocean was troubled to its depths. The clouds poured water, the skies thundered, thy arrows flashed hither and thither. The sound of thy thunder was in the whirlwind, thy lightnings lit up the world, earth shook and quaked. Thy path was through the sea, thy way through mighty waters, and no man marked thy footsteps. Thou didst guide thy people like a flock of sheep, under the hand of Moses and Aaron".

אלהים בקדש דרכך מייאל גדול כאלהים: אתה האל עשה פלא הודעת בעמים עזך: נאלת בזרוע עמך בני יעקב ויוסף סלה: ראוך מים אלהים ראוך מים יחילו אף ירגזו תהמות: זרמו מים עבות קול נתנו שחקים אף-חצציר יתהלכו: קול רעמך בגלגל האירו ברקים תבל רגזה ותרעש הארץ: בים דרכך ושבילך במים רבים ועיקבותיך לא נדעו: נחית כצאן עמך ביד-משה ואהרן

In this connection, it is interesting to note the "non-manifestation" of God contained in *1 Kings* 19.11-2: "The answer came: 'Go and stand on the mount before the Lord'. For the Lord was passing by: a great and strong wind came rending mountains and shattering rocks before him, but the Lord was not in the wind; and after the wind there was an earthquake, but the Lord was not in the earthquake; and after the earthquake fire, but the Lord was not in the fire; and after the fire a low murmuring sound".

ויאמר צא ועמדת בהר לפני יהוה והנה יהוה עבר ורוח גדולה וחזק מפרק הרים ומשבר סלעים לפני יהוה לא ברוח יהוה ואחר הרוח רעש לא ברעש יהוה: ואחר הרעש אש לא באש יהוה ואחר האש קול דממה דקה:

It must be mentioned that some research has suggested that the word *ra'ash* is to be taken as referring to a storm rather than an earthquake. This view is based on the belief that the three natural phenomena mentioned in the passage are placed in descending order of intensity: thus the second phenomenon (the shaking) is less intense than the first (the wind) and is therefore to be attributed to a meteorological disturbance. However, the Jewish exegetical tradition, both ancient and medieval, is unanimous in interpreting *ra'ash* as an earthquake in this passage. The protagonist of the episode is the prophet Elijah. While the passage of the Lord is here accompanied by an earthquake and other divine attributes, the text stresses the fact that the individual phenomena are not in themselves God.

We have already mentioned that earthquakes are a typical sign of the wrath of God. Thus in *Psalms* 18.8 (EVV. 7): "The earth heaved and quaked, the foundations of the mountain shook; they heaved, because he was angry".

ותנעש ותדעש הארץ ומוסדי הרים ירגזו ויתנעשו כִּי־חָרָה לוֹ.

There is a parallel passage in 2 *Samuel* 22.8: "The earth heaved and quaked, heaven's foundations shook; they heaved, because he was angry".

ותנעש ותדעש הארץ מוסדות השמים ירגזו ויתנעשו כִּי חָרָה לוֹ.

The function of earthquakes as vehicles of divine communication is stressed in *Psalms* 46.7 (EVV. 6), where the root **mug* (literally "melt") is used to indicate the movement of the earth. This is a case where the earthquake is itself the voice of the Lord, the direct outcome of his speaking: "Nations are in tumult, kingdoms hurled down; when he thunders, the earth surges".

הָמוּ גוֹיִם מִטּוֹ מַמְלֻכּוֹת נָתַן בְּקוֹלוֹ תְּמוּגַת אֶרֶץ.

In *Joel* 2.1-10, on the other hand, we read: "Blow the trumpet in Zion, sound the alarm upon my holy hill; let all that live in the land tremble, for the day of the Lord has come, surely a day of darkness and gloom is upon us, a day of cloud and dense fog; like a blackness spread over the mountains a mighty, countless host appears; [...] Before them the earth shakes, the heavens shudder, sun and moon are darkened".

תִּקְעוּ שׁוֹפָר בַּצִּיּוֹן וְהִרְעִיזוּ בְּהָר קִדְשִׁי יִרְגְּזוּ כָל יֹשְׁבֵי הָאָרֶץ כִּי־בָא יוֹם־יְהוָה כִּי קָרוֹב יוֹם חֹשֶׁק וְאִפְלָה יוֹם עָנָן וְעֹרְפָל כְּשַׁחַר פֶּרֶשׁ עַל־הַהָרִים עִם רֹב וְעֹצוֹם ... לִפְנֵינוּ רִגְזָה אֶרֶץ רָעֲשׂוּ שָׁמַיִם שֶׁמֶשׁ וִירַח קִרְדּוּ וְכוֹכָבִים אֲסָפוּ נִגְהָם.

In *Jeremiah* 51.29, God is preparing to destroy Babel: the earth shakes in anticipation of the disaster, thus displaying the same reaction (trembling) that fear causes in man: "The earth quakes and writhes; for the Lord's designs against Babylon are fulfilled, to make the land of Babylon desolate and unpeopled".

וְתִדְעֶשׂ הָאָרֶץ וְתַחֲלֵל כִּי קָמָה עַל־בָּבֶל מַחֲשַׁבּוֹת יְהוָה לְשׁוֹם אֶת־הָאָרֶץ בָּבֶל לְשִׁמָּה מֵאִין יוֹשֵׁב.

Earthquakes are a weapon in the hands of God — part of his war armoury. Thus, in *Isaiah* 29.6: "Then suddenly, all in an instant, punishment shall come from the Lord of Hosts with thunder and earthquake and a great noise, with storm and tempest and a flame of devouring fire".

מֵעַם יְהוָה צְבָאוֹת תִּפְקֹד בְּרָעַם וּבְרָעֶשׂ וּקוֹל גָּדוֹל סוּפָה וְסִעָרָה וְלֹהֵב אֵשׁ אוֹכֵלָה.

In all the passages quoted so far, earthquakes are seen to have a religious significance. But at other points in the Bible they have a purely literary value, becoming a *topos* functioning as a form of embellishment. Although certain scholars have tried to find in some of these passages specific evidence of historical fact (see Sieberg 1932 a), a cursory examination is sufficient to show that these are cases where the earthquake theme is simply a literary device. To exemplify this, we will simply quote some passages in which the seismologist N.Shalem, in an important essay published in 1948, finds an echo of real earthquakes. *Joshua* 3.16: "the water coming down from upstream was brought to a standstill; it piled up like a bank for a long way back, as far as Adam, a town near Zarethan. The waters coming down to the Sea of the Arabah, the Dead Sea, were completely cut off, and the people crossed over opposite Jericho".

וַיַּעֲמְדוּ הַמַּיִם הַיְרֵדִים מִלְּמַעְלָה קָמוּ נִדְאָחַד הַרְחָק מֵאֵד בְּאֵדֶם הָעֵיר אֲשֶׁר מֵצָד צִרְתָּן וְהַיְרֵדִים עַל יַם הָעַרְבָּה יִסְיִהֲמֻלַּח תָּמוּ נִכְרְתוּ וְהָעַם עָבְרוּ נֹגֵד יִרְיָחוֹ.

Joshua 6.20: "So they blew the trumpets and when the army heard the trumpet sound, they raised a great shout, and down fell the walls. The army advanced on the city,

every man straight ahead, and took it".

וירד העם ויתקעו בשפרות ויהי כשמע העם את-קול השופר וירדו העם תרועה גדולה ותפל החומה תחתיה ויעל העם העירה איש נגדו וילכדו אתהעיר.

Judges 16.28-30: "Samson called on the Lord and said, 'Remember me. O Lord God, remember me: give me strength only this once, O God, and let me at one stroke be avenged on the Philistines for my two eyes'. He put his arms round the two central pillars which supported the temple, his right arm round one and his left arm round the other, and braced himself and said, 'Let me die with the Philistines'. Then Samson leaned forward with all his might, and the temple fell on the lords and on all the people who were in it. So the dead whom he killed at his death were more than those he had killed in his life".

ויקרא שמשון אליהוה ויאמר אדני יהוה זכרני נא ונתקני נא אך הפעם הזה האלהים ואנקמה נקם-אחת משתי עיני מפלשתים: וילפת שמשון את-שני עמודי התור אשר הבית נכון עליהם ויסמך עליהם אחד בימינו ואחד בשמאלו

1 Samuel 5.1-5: "After the Philistines had captured the Ark of God, they brought it from Eben-ezer to Ashdod; and there they carried it into the temple of Dagon and set it beside Dagon himself. When the people of Ashdod rose next morning, there was Dagon fallen face downwards before the Ark of the Lord; so they took him and put him back in his place. Next morning when they rose, Dagon had again fallen face downwards before the Ark of the Lord, with his head and his two hands lying broken off beside his platform; only Dagon's body remained on it. This is why from that day to this the priests of Dagon and all who enter the temple of Dagon at Ashdod do not set foot upon Dagon's platform".

ופלשתים לקחו את ארון האלהים ויבאחו מאבן העזר אשדודה: ויקחו פלשתים את-ארון האלהים ויביאו אתו בית דגון ויציו אתו אצל דגון: וישכמו אשדודים ממחרת והנה דגון נפל לפניו ארצה לפני ארון יהוה וראש דגון ושתי כפות ידיו כרתות אליהמפתן רק דגון נשאר עליו: עליכן לאיידרכו כהני דגון וכלהבבאים ביתדגון על-מפתן דגון באשדוד עד היום הזה.

1 Kings 20.29-30: "They lay in camp opposite one another for seven days; on the seventh day battle was joined and the Israelites destroyed a hundred thousand of the Aramaean infantry in one day. The survivors fled to Aphek, into the citadel, and the city wall fell upon the twenty-seven thousand men who were left. Ben-hadad took refuge in the citadel, retreating into an inner room..."

ויחנו אלה נכח אלה שבעת ימים ויהי ביום השביעי ותקרב המלחמה ויכו בני-ישראל את-ארם מאה-אלף רגלי ביום אחד: וינסו הנותרים אפקה אליהעיר ותפל החומה עליעשרים ושבעה אלף איש הנותרים ובן-הדד נס ויבא אליהעיר חדר בחדר.

There are in fact very few passages in the Bible where reference is made to earthquakes which actually occurred. In *1 Samuel 14.15* we read: "Terror spread through the army in the field and through the whole people; the men at the post and the raiding parties were terrified; the very earth quaked, and there was panic". real earthquakes

ותהי חרדה במחנה בשדה ובכל-העם המצב והמשחית חרדו גסיהמה ותרגז הארץ ותהי לחרדת אלהים.

It can be seen that at this point in the text there are no accurate chronological indicators, and it is difficult to decide whether the description of the earthquake is to be interpreted as a literary device or as reflecting a real event. Shalem (1948) thinks the episode is based on historical fact. In Amiran's earthquake catalogue (1950-51), biblical earthquakes are completely ignored. According to Soggin (1970), however, at least two real earthquakes can be identified: the one mentioned by Amos and Zechariah,

catalogue

which can be dated to the eighth century B.C. (see entry {001} in this catalogue), and a moderate tremor which occurred at the time of king Uzziah, and of which there is supposed to be an echo in *Isaiah* 6.1-4: "In the year of king Uzziah's death I saw the Lord seated on a throne, high and exalted, and the skirt of his robe filled the temple. About him were attendant seraphim, and each had six wings; one pair covered his face and one pair his feet, and one pair was spread in flight. They were calling ceaselessly to one another, 'Holy, holy, holy is the Lord of Hosts: the whole earth is full of his glory'. And, as each one called, the threshold shook to its foundations, while the house was filled with smoke".

בשנת־מות המלך עזיהו וארצה את־אדני ישב על־כסא רם ונשא ושוליו מלאים את־ההיכל: שרפים עמדים ממעל לו שש כנפים שש כנפים לאחד בשתים יכסה פניו ובשתים יכסה רגליו ובשתים יעופף: וקרא זה אליזה ואמר קדוש קדוש קדוש יהוה צבאות מלא כל־הארץ כבודו: וינעו אמות הספים מקול הקורא והבית ימלא עשן.

This is another case, however, where the reference to phenomena suggestive of an earthquake has a specific literary function and, in our opinion, the context does not permit a firm interpretation to be made, and certainly not one which could be used in an earthquake catalogue. For the same reasons, we think that great care should be taken in evaluating the ample biblical references made by Ben-Menahem (1979), who includes most of the presumed evidence already examined by Shalem. For lack of precise chronological information, we have to be equally cautious in assessing the interesting observations in Rahmer (1870) about a possible echo of earthquakes in another chapter of *Isaiah* (24). This is the chapter with which the "little apocalypse" begins, and in it we read: "Beware, the Lord will empty the earth, split it open and turn it upside down, and scatter its inhabitants [...]"¹⁰ The city of chaos is a broken city, every house barred, that no one may enter [...]"¹² Desolation alone is left in the city and the gate is broken into pieces [...]"¹⁸ if a man runs from the rattle of the scare he will fall into the pit; if he climbs out of the pit he will be caught in the trap. When the windows of heaven above are opened and earth's foundations shake,¹⁹ the earth is utterly shattered, it is convulsed and reels wildly.²⁰ The earth reels to and fro like a drunken man and sways like a watchman's shelter; the sins of men weigh heavy upon it, and it falls to rise no more".

הנה יהוה בוקק הארץ ובולקה ועוה פניה והפיץ ישביה... נשברה קרית־תהו סגר כל־בית מבוא... נשאר בעיר שמה ושמה יכתושער... והיה הנס מקול הפחד יפל אל־הפחת והעולה מתוך הפחת ילכד בפח כ־ארבות ממרום נפתחו וירעשו מוסדי ארץ: רעה התרענה הארץ פור התפוררה ארץ מוט התמוטטה ארץ: נוע תנוע ארץ כשכור והתודדה כמלונה. וכבד עליה פשעה ונפלה ולא־יתסיף קום.

Earthquakes in Greek and Roman myth

One of the most important deities in the Greek *pantheon* is very closely associated with the unleashing of the most elemental and uncontrollable forces of nature. That deity is Poseidon. He is a very ancient god, going back to at least Mycenaean times. The Homeric poems call him the "earth shaker", and also show him exerting all his power as lord of the tempestuous depths of the sea. Both these aspects of his divine power are characteristic throughout the later tradition. Not only does he reign over the stormy seas, but he also controls any subterranean water which rises to the surface. All springs were considered to be "Poseidonian", because they are in contact with the depths of the earth. And similarly, the sea over which he holds sway is not the calm surface across which ships plough their way, but the ocean depths. On the other hand, Poseidon is also the god of earthquakes: he disturbs the depths of the earth, thrusting it down or raising it up. The scene of the punishment of Aias in Homer (*Odyssey* 4.505-10) already associates the god of the sea with the power to split open rocks and bring cliffs crashing into the sea. In fact, there is a whole series of

myth traditions which attributes to Poseidon both earthquakes and floods of a kind which can be interpreted as seismic sea-waves. And it is also worth pointing out that Poseidon's association with natural phenomena of that kind is characteristic of Greek religious attitudes in classical times. Real earthquakes were attributed to him. Thus, for example, the Spartans linked the earthquake of c.464 B.C. to an act of sacrilege committed against Poseidon (Thucydides 1.128.1); and a similar tradition soon took shape in connection with the terrible earthquake in the Gulf of Corinth which destroyed the cities of Helice and Bura. Furthermore, we are told by Xenophon (*Hellenics* 4.7.4), that it was the custom to chant a paean to Poseidon when an earthquake struck. We can therefore confidently assert that "Poseidon remains an embodiment of elemental force: sea storm and earthquake are the most violent forms of energy directly encountered by man" (Burkert 1985, p.139). Here are a few significant examples of Greek mythical traditions which attribute natural catastrophes to Poseidon. One case in point is the creation of the Aegean island of Nisyros. During the War of the Giants, we are told by pseudo-Apollodorus, it was torn off the island of Cos by Poseidon and hurled at the giant Polybotus: "Poseidon, breaking off that piece of the island which is called Nisyros, threw it on him" (trans. J.G.Frazer).

Of particular interest is a tradition encountered by Herodotus (7.129.4). He tells us that it was local to the inhabitants of Thessaly; and it clearly came into being as a characteristic way of explaining in mythical and religious terms the particular morphological appearance of the Tempe valley: "Now the Thessalians say that Poseidon made this passage through which the Peneus flows; and that seems likely; for if you believe that Poseidon is the earth-shaker, and that rifts made by earthquakes are his work, you will judge from the appearance of that passage that it was made by Poseidon; for the rift between the mountains certainly seems to me to be the result of an earthquake".

It is worth noting that the tradition of geographical erudition and later reflection on the nature of earthquakes confirm the explanation of the origin of the Tempe valley in seismic terms (Helly 1989, pp.76-9), though the rationalistic approach naturally leads to the omission of any reference to Poseidon. We find this in Strabo (9.5.2) and especially in Seneca (*NQ* 6.25.2): "Believe it or not as you will, they say that at one time Mt.Ossa was joined to Mt.Olympus; later they were separated by an earthquake, and the whole of a single large mountain was split into two. Then the river Peneus flowed away and dried up the swamps from which Thessaly used to suffer by carrying off the waters that had stagnated because they had no way out".

Just as the Greek mentality and Greek religious thought associate Poseidon with the violence of ocean storms, so the Greek mythical tradition attributes to him a series of massive floods in the Aegean area, most of which are related to primordial times. It is possible that the memory of real events contributed to the establishment of these traditions, which had in any case been part of the experience of the peoples who inhabited the islands and coastal areas of the Aegean since time immemorial; but it would naturally be fruitless, as well as methodologically unsound, to identify in any particular tradition the transposition into mythical terms of specific historical or prehistorical phenomena. The "language" of myth has an autonomous meaning which must be respected.

While this is not the place to analyse the nature and origin of a whole series of traditions, it is at least worth mentioning them briefly.

In the mythical past of the religious "prehistory" of Argolis, we find reference to a primordial flood at Argos caused by the wrath of Poseidon. This is how Pausanias (2.22.4) describes it: "Here [at Argos] is a sanctuary of Poseidon of the Surf: they say that when Inachus and his jury decided that the land belonged to Hera and not to him, Poseidon flooded most of the countryside. Hera obtained an agreement that the sea should go back again, and the Argives consecrated a sanctuary to Poseidon of the Surf

Poseidon

explanation of the origins

at the place it went back from".

Just as the flooding by the sea of the Thriasian plain near Eleusis, in Attica, was attributed to the wrath of Poseidon following his defeat by Athena over the possession of Attica, so a similar natural phenomenon in the alluvial plain of Argos, was interpreted as the result of arbitration between Hera and Poseidon over the possession of Argolis. Apparently a temple to Poseidon of the Surf was subsequently built at the point where the sea water had reached farthest inland. The temple which Pausanias mentions seems to have been on the seaward side of the agora of Argos.

The traditions concerning the ancient flooding of Argolis can probably also allow us to establish a general context for a local myth of secondary importance. As we read in Pausanias (2.32.8): "Outside the city wall there is also a sanctuary of Poseidon of Growth; they say he was angry with them and destroyed the crops of the country by inundating roots and seeds with sea-water, until he yielded to prayers and sacrifices and stopped sending sea-water over the land. Overlooking Poseidon's shrine is that of Law-giving Demeter, established, so they say, by Altheos".

What we have here is an attempt to explain the epithet Phytalmios (he who encourages the growth of plants) as applied to Poseidon. While the story may refer to a sea flood caused, as usual, by the wrath of Poseidon, it has nothing to say about the cause of that wrath, unlike the cases of the floods in the Thriasian plain in Attica and the plain of Argos, which are also traditionally interpreted as the result of Poseidon's wrath.

the violence of the sea But the mythical tradition which was probably best known in antiquity for the involvement of Poseidon in unleashing the violence of the sea against a substantial stretch of coast was that concerning the origins of Athens.

The earliest report of this myth appears in Varro (*Hist. Rom.* F 11, *apud Aug. Civ. Dei* 18.9), in the following terms: "When an olive tree suddenly appeared there, and water gushed forth somewhere else, the king was disturbed by these prodigies, and sent to ask Apollo how they should be interpreted and what should be done. He replied that the olive tree was the symbol of Minerva and the water of Neptune, and that it was up to the citizens to decide whether the city should be named after the one or the other of the deities whose symbols these were. When Cecrops received this response, he summoned all the citizens of both sexes (for it was then the custom there for women to take part in public deliberations), and asked them to cast their vote. This was done, and the men voted for Neptune and the women for Athena, and since the women were found to have a majority of one, Minerva was victorious. In his rage, Neptune then laid waste Athenian territory with the tumultuous waves of the sea. To placate his anger [...] the women were punished by the Athenian men in three different ways: from then onwards they were not to vote, no child of theirs should bear its mother's name, and no-one should call them Athenians".

Neptune

Pseudo-Apollodorus ([*Apollod.*] 3.14.1) has this to say on the same subject: "Cecrops was autochthonous, and his body was part man and part serpent. He was the first king of Attica, and the land previously called Acte he renamed Cecropia after himself. It was in his time, they say, that the gods decided that each should own and occupy a different city in which he would have his own individual honour. So Poseidon came first to Attica, struck his trident on the middle of the acropolis, and created a sea which they now call Erechtheis. Athena came after Poseidon, and after getting Cecrops to witness her ceremony of occupation, she planted an olive tree, which is now pointed out in the Pandroseium. When Athena and Poseidon quarrelled over the land, Zeus separated them and appointed as judges not, as some say, Cecrops and Cranaus, nor Erysichthon, but the twelve gods. Their verdict was in favour of Athena, after Cecrops testified that she planted the olive first. So Athena called the city Athens after herself, but Poseidon, in wild rage, flooded the Thriasian plain and put Attica below sea level". (In this connection, see also Hyginus *fab.* 164).

There is another story in the Hellenistic mythical tradition in which a massive flood is attributed to the wrath of Poseidon. It evidently develops an ancient epic tradition concerning the origins of Troy, with particular reference to the construction of its walls by Poseidon and Apollo (Homer, *Il.* 7.452ff., *Od.* 21.441-57), but details of the flood do not appear.

Pseudo-Apollodorus (2.5.9) has this to say: "He found the city in dire straits because of the wrath of Apollo and Poseidon... so Apollo sent a pestilence upon them, and Poseidon sent a sea-monster which would come inland on a flood-tide and seize people on the plain".

In Diodorus (4.42.2-5) we read: "It is said that, because of the legendary fame of the building of the walls of Troy, Poseidon was angry with King Laomedon, and sent a great monster out of the sea and on to the land, and it seized those who made a living by the shore or farmed along the coast; and a plague also struck the people and totally destroyed their crops. Everyone was dismayed at the extent of their troubles, and therefore met together to decide how to remedy their misfortune. Then the king sent messengers to consult Apollo on the matter, and received the response that these things were caused by the wrath of Poseidon, and would come to an end when the Trojans of their own accord chose by lot one of their children to be given to the monster to be devoured. All children were involved in this, and the name drawn was that of the king's daughter Hesione. Laomedon was therefore obliged to hand over the young woman, who was left bound on the shore. But it so happened that Heracles had landed there with the Argonauts at that time, and when he learned what had happened to the young woman, he released her from her bonds and entered the city, promising to kill the monster".

The myth is recounted again by Ovid (*Met.* 11.199-215): "Apollo sees Laomedon beginning to build the walls of the new city of Troy. Because so great an enterprise can only advance with difficulty, and requires great wealth, he obtains the assistance of the god who bears the trident, the father of the ocean depths, and assuming human form, he builds the walls for the king of Phrygia in return for a sum of gold. When the work is completed, the king refuses to pay the agreed sum and, what is worse, adds insults to his false promises. 'You shall not remain unpunished', said the lord of the sea, and he channelled all his waters on to the shore of that greedy city, turning the land into sea, destroying the farmers' crops, and flooding the fields. But that punishment was not enough: the king's daughter was also required to be given to a sea monster. She was chained to a hard rock, but Hercules freed her. However, when he asked for the horses which had been promised him as a reward, he was denied the recompense for his great service, and so he stormed the walls of Troy and seized the doubly perfidious city". the "vengeance" of the gods

It is interesting to note that even in antiquity this myth was subjected to rationalistic scrutiny, for it seems likely that Strabo had stories of this kind in mind when he referred to a sea flood at Troy. There is a reference in Strabo (1.3.17) to Demetrius of Scepsis, according to whom there had been a sea flood at Troy: "And he [Demetrius of Scepsis] recalls on this point [...] and a tidal wave submerged the Troad".

Many of the motifs and themes which are to be found in the accounts referred to above recur in another myth concerning Poseidon, which is set in Lycia.

Nymphis (*FGrHist* 432 F 7) tells of a flood in the valley of the river Xanthus: "Bellerophon killed a boar which was destroying animals and crops in the countryside of Xanthus, but was denied any reward. He cursed the Xanthians in the presence of Poseidon, who covered the valley with sea-water, so that the soil became salty and the land unproductive; but finally Bellerophon was moved to compassion by the prayers of the women, and asked Poseidon to assuage his anger. That is why the Xanthians were also required by law to take the name of their mother and not their father".

Further details can be found in Plutarch (*Mor.* 248 A-C): "What is said to have hap-

pened in Lycia sounds like a myth, but the tales that are told about it supply some supporting evidence. They say that Amisodarus, who is called Isaras by the Lycians, arrived from the Lycian colony in the vicinity of Zeleia, bringing with him pirate ships commanded by Chimarrhus, a warlike, bloodthirsty and brutal man. He sailed in a ship with a lion as its figurehead and a serpent at the stern. He was the scourge of the Lycians, and it was not possible to sail the sea or even to live in cities near the sea. Bellerophon pursued this man on Pegasus, and killed him. He also drove out the Amazons, but was not justly rewarded; in fact Iobates behaved most unjustly towards him. Bellerophon therefore waded into the sea and prayed to Poseidon to punish Iobates by making the land sterile and unproductive. After making his prayer, he went away, and a wave arose and inundated the land. It was a fearful sight as the sea followed him high into the air and flooded the plain. Men begged Bellerophon to put a stop to it, and when he refused, the women tucked up their tunics and flocked about him in a crowd. He drew back out of respect, and they say that the waters drew back at the same time. Some play down the fabulous element in the story, and say not that his curses made the sea obedient to his will, but that the more fertile part of the coastal plain was below sea level; that Bellerophon broke off the long spur of a promontory which separated the sea from the land, so that the sea burst in and flooded the plain; and that while the men obtained nothing by begging him to desist, when the women flocked around him, he was moved to compassion and his anger subsided.

Others claim that the Chimaera, as it was called, was simply a mountain facing the sun which produced fierce and fiery reflections of the sunlight in summer, and that these beat upon the whole plain and dried up the crops. Bellerophon realised what was happening, and so he cut away the smoothest part of the mountain face which was largely responsible for the reflections. Since no gratitude was shown for his action, he turned against the Lycians in revenge, but was prevailed upon by the women to desist".

the origins of islands

Scholars in antiquity were aware of a series of different traditions which did not have the obvious mythical and religious connotations of those we have referred to above, but which, because they were concerned with the origins of certain Aegean islands, involved a time-scale receding into the deep obscurity of the past. Consequently, they can be considered as evidence only of natural phenomena having occurred at some indeterminate period rather than during a specific historical age. What we have here, in effect, is the application, within the sphere of naturalistic and erudite literature, of forms and types which derive from a matrix of a mythical kind but take on a rationalistic appearance. The most frequently used motif is that of an island emerging from the depths of the sea as a result of some cataclysm.

A good example of this mythical "model" is to be found in the famous lines of Pindar's seventh Olympian ode (lines 54-70), about the origin of the island of Rhodes. We do not consider it appropriate to examine such texts here, however, since we do not think they are strictly relevant to real seismic phenomena.

Even though their origins may have a mythical connotation, there is some information of an antiquarian and geographical kind in the stories we are told about disastrous floods caused by Lake Copais in Boeotia (Strabo 9.2.18; Plin. *n.h.* 2.206; Paus. 9.24.2). In Ammianus Marcellinus (17.7.13), there is a reference to this tradition, which evidently derives from an earlier erudite interpretation of events involving specific reference to an earthquake: "There are four kinds of earthquake; for they are either *brasmatae*, or upheavals, which lift up the ground from far within, like a tide, and force upwards huge masses, as in Asia [...] and Eleusis in Boeotia".

The theme of floods linked to violent changes in the geological appearance of the landscape may be connected with seismic phenomena, but, given the mythical contexts, the ancient sources do not make identification easy. There is a passage in Diodorus Siculus (5.47.3-5) which is not without rationalistic re-elaboration and speculation,

but in which we can clearly see reflections of a legend or an aetiological tradition, possibly originating in a local source, concerning the origin of the straits which joined the Aegean and the Black Sea — one of the places which particularly stimulated the imagination of the ancients: “The Samothracians have a story that before the floods which affected other peoples, they suffered a very serious one themselves: the outlet at the Cyanean Rocks having first burst open, and then the Hellespont. They say that the Pontus, which had previously been a lake, became so full of water from the rivers that flow into it, that the great mass of water burst out into the Hellespont with great violence, flooded a large part of the coast of Asia, and transformed a considerable part of the low-lying land of Samothrace into a sea. That is the reason, we are told, why fishermen in later times have brought up stone capitals in their nets, thus revealing that cities were submerged in the flood. The inhabitants, the story goes on, took refuge in the higher parts of the island, and since the sea level continued to rise, the local people prayed to the gods and, once they were out of danger, they set up cippi all round the island, to bear witness to the danger from which they had escaped, and they dedicated altars on which they make sacrifices to this day; and this is evidence that they inhabited Samothrace before the flood”.

Diodorus' narrative in the “book of the islands” begins with the “archaeology” of Samothrace. In this part of the work, considerable emphasis is placed on natural disasters, of which a fairly clear memory was retained in certain Aegean islands. The principal traditions are those concerning *kataklysmói*, (i.e. floods), whether caused by torrential rain or sea-waves. The first of these two kinds is also mentioned in relation to Rhodes and the coast of Asia Minor opposite Lesbos.

Leaving on one side the complex (and in our case perhaps insoluble) problems concerning the identification of primary sources, it is worth drawing attention to certain



The Triumph of Neptune. Drawing of a gold and silver badge from an ancient shield. The badge was discovered in Milan in 1841 (Biblioteca dell'Archiginnasio di Bologna, Gabinetto delle Stampe, Archeologia, no.144).

aspects of the available evidence which might be described as unique. The tradition at Samothrace was of a flood which predated all other local or universal floods. A split seemed to have occurred, and to provide a rational explanation for it, the suggestion was made that the Pontus (Black Sea) must have been some kind of lake or inland sea like the Caspian Sea, and that the continuous and increasing inflow from rivers had caused the water level to rise, with the result that a violent flood had connected it to the Aegean, thereby involving not only Samothrace but the Aegean coast of Asia Minor as well.

There is a reference to the seismicity of Lycia in connection with the myth of Gyges (still within the framework of mythical memories subsequently subjected to rationalising interpretations) in Plato (*Resp.* 359c.) and later on in Philostratus (*Heroic.* 2.629): the earth opened up and a chasm appeared "after torrential rain and an earthquake"; and inside the chasm Gyges is supposed to have discovered, as though he were on a kind of fabulous journey, a bronze horse with doors in it, containing an enormous corpse from which Gyges took a ring. The mention of earthquakes as causing the earth to split open, with the subsequent discovery of giant-sized human remains, sounds like a literary *topos*. There is a similar kind of reference in Phlegon of Tralles (*FGrHist* 257, F 36.19), who derives it from Theopompus of Synope: a hill in the Cimmerian Bosphorus is supposed to have split open — again as a result of an earthquake — to reveal bones of enormous size. We do not think we are entitled to use such references to provide a historical basis for events which may indeed have occurred, but whose mythological aspects make them unsuitable for inclusion within the strict limits of an earthquake catalogue.

We do think, however, that it is worth mentioning the many sources which record a natural disaster which struck the whole Sipylus area. Certain authors, including Aristotle (*Mete.* 2.8.368b) and Strabo, specifically say that it was an earthquake which caused the upheaval in the region; but in fact it seems more likely that massive subsidence or a landslide was involved.

There is a reference in Strabo (1.3.17) to Demetrius of Scepsis, according to whom some very violent earthquakes had taken place in Ionia: "He [Demetrius of Scepsis] recalls on this point what Democles had to say about the violent earthquakes which took place in ancient times in Lydia and Ionia as far as the Troad, as a result of which some villages were swallowed up and Sipylus was reduced to ruins, at the time of the reign of Tantalus, and the marshes became lakes and the Troad was flooded from the sea". There is another passage in Strabo (12.8.18) where he records the great earthquake of 17 AD., and refers to past tremors at Sipylus: "And the story of Mt. Sipylus and its ruin should not be dismissed as mythical".

While other authors report the collapse of Mt. Sipylus, they do not refer to earthquakes (Pherecydes in Book VIII, for example). Pausanias is a rather important source, because he was probably born at Magnesia on Mt. Sipylus, and he records the occurrence as being similar to the earthquake disaster at Helice: "The same thing happened in a different form [...] when the city of Sipylus disappeared into a chasm, and water gushed out from the crack in the mountain, changing the chasm into Lake Saloe: you could see the ruins of the city in the lake, until the torrent covered up even the ruins".

Pliny the Elder is probably referring to the same occurrence in two passages in the *Naturalis historia* (2.205 and in *Schol. Cic. Bob.* Hildebrandt, p.36) where massive subsidence is reported again, though with no mention of an earthquake: "The very earth swallowed it up in a chasm, and it was there that the city called Sipylus was subsequently founded". Although the image of the devastation of Sipylus frequently occurs, as we have seen, in ancient history, the event is attributed to the reign of Tantalus — in other words, to a period which is mythical rather than historical.

Suggestions for using the catalogue

The earthquakes in this catalogue are arranged in chronological order. Given the long time span involved, it would have been impossible to arrange the entries by regions in a way that was geographically and historically coherent. But a chronological arrangement brings its own problems, because of the different calendars in use. To this day, different peoples use different calendars, and there is still no wholly accepted way of transposing these diverse systems into a single universal one. In the case of ancient datings, however, it is often not sufficient to make precise calculations which will relate one calendar to another, because there is an underlying difference in the conception of time (for a consideration of certain aspects of this problem, see above). The lack of a thorough study of the problem of ancient calendars in the Mediterranean world (such as that of Bilfinger 1892, for example, on ancient and medieval computations of the hours), as well as the lack of critical editions of sources (especially from Byzantine regions and Syria) which take these factors into account, inevitably leaves a number of problems to be solved.

To these more general considerations we have to add the fact that different literary and narrative usages affect the dating of earthquakes. An earthquake might thus be dated by *attraction* to social, military or political events which were considered important and had occurred before or after it, even to the extent of several years. This cultural time factor has an important consequence in relation to this catalogue, because it could happen that a number of earthquakes which may have occurred over a period of one or more decades are recorded as a single event. And the opposite can also happen: that is to say, a single earthquake may be duplicated by being recorded in relation to a series of different social events in independent sources.

fluid parameters

It is therefore important not to misunderstand what we are trying to do in bringing order to this considerable mass of data. The chronological information given in the catalogue is not to be interpreted in a rigid and definitive way; for it may be possible in the future to achieve a more accurate definition of the chronological variations which we have indicated, either as a result of the discovery of new sources or through contributions in new critical editions of known sources. In these circumstances, it is necessary to keep in mind the degree to which time limits are in many cases approximate — especially when the sources only indicate a period of time, sometimes covering more than a decade — in order to avoid creating earthquake doublets. We therefore suggest that anyone wishing to use our data, or to improve on them by means of further research, should consider this problem with care when other sources give slightly different datings from those listed here. We have indicated those cases which we think are doubtful.

It scarcely needs mentioning that this earthquake catalogue is unlike those which deal with later periods, in that the information it contains is not suitable for traditional direct statistical treatment, and needs to be handled with care. Since it cannot be considered exhaustive, it can in general offer only descriptive information as far as seismic geography is concerned, and only approximate values in relation to the assessment of the “size” of the various recorded earthquakes. As regards the dimensions of the felt area, however, it is often possible to establish parallels with events which are nearer to us in time, and identify “families” of earthquakes.

The degree of historical *reliability* of the listed earthquakes is much higher than the fluid nature of their spatio-temporal parameters would suggest, because it derives not so much from the precision of these parameters as from the critical context of the sources. Consequently, the overall picture of seismic activity which can be obtained from this catalogue is to be understood as an approximation to reality. And one also has to take into account the *fuzziness* of the language used by the sources to describe phenomena which we now observe with the aid of scientific instruments and quantify

numerically. We have thus not tried to produce a catalogue in the strict sense of the term: one whose sole aim is to reorganise the descriptive data found in the historical sources into a set of rigid and unified entries; for such entries would, in our opinion, only be capable of classification in a traditional way. The particular nature of most of the sources would constitute an insurmountable obstacle to any such approach; the assembled data would seem unusable or else open to a variety of interpretations. In the present state of seismological knowledge, we think it advisable to approach these "shadowy" earthquakes using less rigid methods. The seismic events concerned should not be arbitrarily filled out, but left with slightly shadowy outlines, in a way which is more consonant with the nature of the sources and the traditions to which they belong. An acceptance of the diversity of cultures and cognitive systems is, in our view, a correct anthropological approach not just for modern cultures, but also for those of the past. To impose a *reductio ad unum* by adopting standard techniques of analysis (which may even be out of date in some cases) would in our opinion involve an impoverishment of the basic data. Given the descriptive nature of the data and the limited possibilities we have for arranging and interpreting them, we take the view that what they can do is serve both to improve research into other types of sources and to encourage the use of new methods.

Phenomena recorded

We have recorded not only earthquakes and seismic sea-waves, but also other geophysical and geomorphological phenomena, such as the emergence of islands, subsidence and landslides. These have been included even in cases where there was insufficient evidence to be sure whether they were directly related to the seismic activity or not (the uncertainty always being indicated). Volcanic eruptions are included only when the sources specifically mention associated seismic effects.

Dates

Dates (day, month and year) are given in terms of the *Julian Calendar*. When the date in the sources is very approximate, we have tried to provide some other indication, such as a period within which the earthquake occurred, or two alternative dates, or a *terminus ante quem* or *post quem*.

Locations

The names of the sites and of other geographical elements (rivers, mountains, valleys, etc.) are the ones indicated in the sources. The heading of each entry includes localities struck not only by earthquakes, but also by other correlated phenomena (seismic sea-waves, landslides, etc.). Ancient place names are given when a site has not been continuously inhabited. When the site has been continuously inhabited and is the same as a modern site, its name is given in the present-day language of the country concerned or in its English equivalent, if there is one.

The names of unidentified places are given in italics: it is a very small number of cases. The names of places struck by an earthquake are given in alphabetical order, to make it clear that no strict preference has been given to epicentral areas. Also the names of historical regions, when indicated by the sources, are entered in alphabetical order, after the names of places.

Entry commentaries

In addition to an indication of sources and relevant research, each entry also has a commentary, whose breadth and depth vary a great deal. Some earthquakes have been studied more than others, in which case we have been able to provide a more substantial survey; others have been investigated by us in the course of our research; and yet others remain more in the shadows, even though all the sources have been brought

together. These differences in the state of our knowledge are inevitably obvious in this catalogue. That many earthquakes need to be further investigated both in themselves and in their historical context is a fact which leads us to hope that our work will stimulate other scholars to undertake a second and more advanced research programme. For reasons of uniformity, as has already been pointed out in connection with the problem of sources, the commentary within an entry does not always follow the chronological order of the sources. In some cases, it has been necessary to deal with later sources first (they in any case depend on reliable earlier traditions), in order to set out developments in the history of the earthquake and establish its exact location.

Languages

We have used historical sources in the following original languages: Hebrew, classical and middle Greek, classical and middle Latin, Arabic, Syriac, Armenian, Coptic and Ethiopic. Where available, we have used English translations in critical editions. In other cases, a translation has been made from the original language, avoiding translations of translations whenever possible. Where passages from old translations are quoted, the language has been modified in the light of the requirements of modern English.

The evaluation of seismic effects and the estimates of intensity

Information about seismic effects has been contextualized as much as possible, considering the general urbanistic and building schemes previously outlined in the introduction. Still, the numerous filters that have been selecting information in the sources (due to the different cultures, the historical framework and the irreparable loss of many records), and the filters that model our knowledge of ancient territories create complex and undirect relationships between the damage described and interpretations of the damage itself. Therefore, as it has been mentioned before, intensity assessments should be seen as "soft" information, a sort of indicative value on which further investigations can be directed.

Where the context allows this, an intensity value has been attributed to the seismic effects described in the sources, using the European Macroseismic Scale (Grünthal 1993). We have avoided attributing a degree of intensity to effects on a single building. For such cases, we have drawn up a small scale of effects which will be found in the legend of the *Short catalogue* (see p.408).

In order to assist rapid consultation of the entries, qualitative data concerning destructive effects reported in the sources are expressed by means of symbols (see p.104). This system has been chosen in order to draw immediate attention to destructive seismic effects, by providing at least a rough and ready assessment of them.

Maps

We have chosen to provide maps of the areas affected by some earthquakes, using the place names mentioned in the sources. These small maps not only show at a glance where the greatest recorded effects were felt, but also provide a valuable rapid impression of the extent of the area affected, since the dimensions of these areas can give some idea of the "size" of an earthquake.

Moreover, the catalogue data are summarised in 8 maps (pp.414-21). The locations indicated provide a kind of geographical guide rather than seismological references in the strict sense of the term. The maps give only one of the places mentioned in the sources: either the best known, or one which the basic historical data indicate as amongst the most seriously damaged.

Symbols and headwords used in the catalogue entries

- / separates two alternative dates or periods
 - joins the beginning and end of a chronological period
 - ? indicates a very uncertain or hypothetical location or date
 - destructive effects
 - geomorphological changes
 - ▷ < various phenomena accompanying an earthquake (landslides, volcanic eruptions, subsidence, floods, the emergence of islands)
 - = indicates that two sources are parallel or that one depends on the other
 - apud* indicates a lost text quoted by an ancient or early medieval source
 - [] indicates a text attributed to an author (= *pseudo*...)
 - [negative] indicates a source used *ex silentio*, of particular importance only for certain contexts
 - [year] indicates dating of manuscripts
- sources 1 written sources which record an earthquake. This category also includes later texts, if they make use of earlier traditions and add important details
- sources 2 written sources which are later than the event and for the most part repeat already known information. This bibliographical section makes it possible to evaluate the tradition and reputation of an earthquake in later centuries
- We wish to point out that certain texts given under "sources 1" may not figure in the entry in their entirety, but simply be summarised. This applies not only to texts which contain contextual references, such as information about rebuilding or economic effects, but also to those which refer to seismic effects. For example, a Byzantine writer copies the entire report of an earthquake from an earlier writer, but adds further information (the collapse of a church, a different number of victims, etc.). The later writer may have had available a more complete edition of the earlier work, or he may have obtained the additional information from other sources. If we are unable to demonstrate that this is so, we are obliged to consider him as belonging under "sources 1" to the extent that he is the sole source, or the first in chronological order, to supply new information. Thus the inclusion of texts under "sources 1" or "sources 2" depends on their relationship to an earthquake and not to their internal relationships with one another. It is not necessarily the case, therefore, that a "sources 2" text always depends on one from "sources 1". There may be intermediate sources or parallel traditions which have been lost or are not always known.
- inscriptions epigraphical sources: written texts on stone or durable materials
- coins coins struck in specific connection with an earthquake
- literature bibliography of historiographical, archaeological and scientific works, including contributions which have no direct reference to the earthquake in question, but enable us in particular cases to obtain more accurate datings or locations. In chronological order
- catalogues earthquake lists from the pre-modern erudite or antiquarian traditions; earthquake lists compiled by historians; and modern earthquake and seismic sea-wave catalogues. In chronological order. Sometimes the dates reported in the catalogues does not exactly coincide with the ones written in the entries.

Earthquakes from 760–750 B.C. to 995 A.D.

<001> c.760–750 B.C. ●Jerusalem, O the valley of Hinnom ▷landslide◁

- sources** Amos 1.1; Zechariah 14.3-5; 2 Chron. 26.16-7; 2 Kings 15.1-7; Ioseph. AJ 9.223-7;
Avot de-Rabbi Nathan 9
- literature** Rahmer (1870); Shalem (1948); Yadin (1961); Soggin (1970); Dever (1992)
- catalogues** Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Sieberg (1932 a);
Ben-Menahem (1979); Guidoboni (1989)

In our opinion, this is the only earthquake mentioned in the Bible for which there is sound and direct historical evidence. At the beginning of the Book of Amos, we read: "The words of Amos, one of the sheep-farmers of Teqoa, which he received in visions concerning Israel during the reigns of Uzziah king of Judah and Jeroboam son of Jehoash king of Israel, two years before the earthquake".

דברי עמוס אשר-היה בנקדים מתקוע אשר חזה על-ישראל בימי עזיה מלך-יהודה ובימי ירבעם בן-יואש מלך ישראל שנתים לפני הרעש.

Amos is considered to be the foremost and earliest of the prophets of Israel. The opening words of the book say that he lived at Teqoa, a village south of Bethlehem; and — if we accept the biblical chronology — it is possible to establish fairly accurately that he was active during the reigns of Uzziah in Judah (c.783-742 or 787-736 B.C.) and Jeroboam II in Israel (c.786-746 or 787-747 B.C.). Since the memorable occurrence of an earthquake is used in the prologue to the book to indicate the date of the prophecy, it must have been serious enough to suggest itself as an obvious and unquestionable term of reference, even though a number of years had passed. But exactly when did the earthquake occur, and what area did it affect? While Amos provides us with the broad chronological limits of c.787 and c.736 B.C., we can gain more accurate information from the book of the prophet Zechariah. According to Rahmer (1870), Shalem (1948, p.28), Soggin (1970) and Ben-Menahem (1979), the whole of Zechariah 14.3-5 is related to an earthquake which occurred during the reign of king Uzziah. First of all, however, it has to be kept in mind that the passage in question, as it appears in the Hebrew text of the Bible, is very corrupt. If it is to be interpreted correctly, therefore, we must have recourse to emendations arrived at by comparing it with early Aramaic, Greek and Latin translations of the Scriptures. Using the textual emendations suggested in the apparatus to the *Biblia hebraica Stuttgartensia*, we can establish the following reading: "The Lord will come out and fight against those peoples, as in the days of his prowess on the field of battle. On that day his feet will stand on the Mount of Olives, which is opposite Jerusalem to the east, and the mountain shall be cleft in two by an immense valley running east and west; half the mountain shall move northwards and half southwards. And the valley of Hinnom shall be blocked, for it shall reach as far as [the valley] which is close to it [the text being emended to read as follows: *We-nistam ge'-Hinnom ki-yaggia' ge-Hinnom el eslo*]. You shall flee as you fled from the earthquake in the time of Uzziah king of Judah. And the Lord my God will appear with his angels".

ויצא יהוה ונלחם בגוים ההם כיום הלחמו ביום קרב: ועמדו רגליו על ההר הזתים אשר על-פני ירושלים מקדם ונבקע הר הזתים מחציו מזרחה וימה גיא גדולה מאד ומש חצי ההר צפונה וחציו-נגבה: ונסתם גיא-הנחם כי-יגיע גיא-הנחם אל-הצל ונסתם כאשר נסתם מפני הרעש בימי עזיה מלך-יהודה ובא יהוה אלהי בליקדשים עמך.

A literal translation of verse 5, however, following the unemended Hebrew text, gives a different topographical description of events: "You shall flee from the valley of the

hills, for the valley of the hills will reach as far as Asal; you shall flee as you fled from the earthquake in the time of Uzziah king of Judah".

It should be noted that, even though the prophecy about Jerusalem is expressed in the future, the reference to the earthquake at the end of verse 5 and the accuracy with which the splitting of the Mount of Olives into two is described, suggest an underlying historical earthquake experience.

The passage from Zechariah is to be related to what Josephus has to say (AJ 9.223-7) about damage to the Temple in Jerusalem in an earthquake provoked by an impious act on the part of Uzziah king of Judah: "Thus, on the occasion of a notable day which was a public festival, he put on the priestly garment and entered the sacred precinct to offer sacrifice to God on the golden altar. And, when the high priest Azarias, with whom there were eighty priests, tried to prevent him — for they said it was not lawful for anyone to offer sacrifice, but to do so was allowed only to those of the line of Aaron — and they all clamoured for him to go out and not transgress against God, he became angry and threatened them with death if they did not hold their peace. But, while he spoke, a great tremor shook the earth, and, as the temple was riven, a brilliant shaft of sunlight gleamed through it and fell upon the king's face so that leprosy at once smote him, while before the city at a place called Erōgē half of the western hill was broken off and rolled four stades till it stopped at the eastern hill and obstructed the roads and the royal gardens. When the priest saw the king's face smitten with leprosy, they explained to him the cause of his misfortune, and told him to go out of the city as an unclean person".

Ἐνοστάσης δ' ἡμέρας ἐπισήμου καὶ πάνδημον ἑορτὴν ἐχούσης, ἐνδὺς ἱερατικὴν στολὴν εἰσῆλθεν εἰς τὸ τέμενος θυσιάσων ἐπὶ τοῦ χρυσοῦ βωμοῦ τῷ θεῷ. τοῦ δ' ἀρχιερέως Ἀζαρία, ὄντων σὺν αὐτῷ ἱερέων ὀγδοήκοντα, κωλύοντος αὐτόν (οὐ γὰρ ἐξὸν ἐπιθύειν εἶπον, μόνοις δ' ἐφεῖσθαι τοῦτο ποιεῖν τοῖς ἐκ τοῦ Ἀαρῶνος γένους), καταβοώντων δ' ἐξιέναι καὶ μὴ παρανομεῖν εἰς τὸν θεόν, ὀργισθεῖς ἠπέλιπεν αὐτοῖς θάνατον, εἰ μὴ τὴν ἡσυχίαν ἄξουσι. μετὰ δὲ σεισμός ἐκλόνησε τὴν γῆν μέγας, καὶ διαστάντος τοῦ ναοῦ φέγγος ἡλίου λαμπρὸν ἐξέλαμψε καὶ τῇ τοῦ βασιλέως ὄψει προσέπεσεν, ὥς τῷ μὲν εὐθέως λέπραν ἐπιδραμεῖν, πρὸ δὲ τῆς πόλεως πρὸς τῇ καλουμένῃ Ἐρωγῇ τοῦ ὄρους ἀπορραγῆναι τὸ ἥμισυ τοῦ κατὰ τὴν δύσιν καὶ κυλισθὲν τέσσαρας σταδίους ἐπὶ τὸ ἀνατολικὸν ὄρος στῆναι, ὥς τὰς τε παρόδους ἐμφραγῆναι καὶ τοὺς παραδείσους τοὺς βασιλικούς. ἐπεὶ δὲ κατειλημμένην τὴν ὄψιν τοῦ βασιλέως ὑπὸ τῆς λέπρας εἶδον οἱ ἱερεῖς, ἔφραζόν τε αὐτῷ τὴν συμφορὰν καὶ ἐκέλευον ἐξιέναι τῆς πόλεως ὡς ἐναγῇ.

The same damage as that mentioned by Josephus is also mentioned in chapter 9 of *Avot de-Rabbi Nathan*, one of the so-called extra-canonical tractates of the Talmud: "In connection with Uzziah we find [written (2 Chron. 26.16-7)]: 'But when he gained power, his heart grew so proud that it caused his downfall. For he transgressed against the Lord his God and went into the sanctuary of the Lord to offer incense on the altar of perfumes. He was followed there by the priest Azaryahu with eighty courageous priests of the Lord. They stood before king Uzziyahu and said to him: 'It is not for you, Uzziyahu, to offer incense to the Lord, but for the priests who are sons of Aaron and who were consecrated to offer incense. Leave the sanctuary, for you have sinned and your reputation before the Lord God will not be improved by it'. Uzziyahu grew angry, as he held the censer in his hand, and at the moment of his irritation with the priests, leprosy appeared on his brow'. At the same moment the temple split open and the fissure extended for twelve miles in each direction. The priests made him leave, and he himself hurried to depart because the Lord had struck him. [King Uzziyahu] remained a leper until his death, and lived in a leper house, because he had been sent away from the house of the Lord. Meanwhile, his son Jotham supervised the royal palace and administered justice to the people of the country".

שכן מצינו בעוזיהו שנאמר וכחזקתו גבה לבו עד להשחית וימעל מעל בה' אלהיו ויבא אל היכל ה' להקטיר על מזבח הקטורת ויבא אחריו עזריהו הכהן ועמו כהנים לה' שמונים בני חיל ויעמדו על עוזיהו המלך ויאמר לו לא לך עוזיהו להקטיר לה' כי לכהנים בני אהרן המקדשים להקטירו צא מן המקדש כי מעלת ולא לך לכבוד מה' אלקים ויזעף עוזיהו ובידו מקטרת להקטיר ובזעפו עם הכהנים והצרעת זרחה במצחו (דה"י ב' כ"ז ט"ז י"ט). באותה שעה נבקע היכל אילך ואילך שנים עשר מיל על שנים עשר מיל. והיו ההנים מבהלים (אותו) לצאת וגם הוא נדחף לצאת כי נגעו ה' ויהי מצורע עד יום מותו וישב בית החפשיית מצורע כי נגזר מבית ה' ויותם בנו על בית המלך שופט את עם הארץ (שם שם כ"א וכו').

See also *Midrash Tanhuma* to Noah, chapter 5 and Jerome's commentary on *Amos* (PL, vol.25, col.992).

The Scriptures also contain another passage about Uzziah which is parallel to that in *Chronicles*. It is to be found in *2 Kings* 15.1-7, where Uzziah is strangely called Azariah. There can be no doubt, however, that the same person is being referred to: "In the twenty-seventh year of Jeroboam king of Israel, Azariah son of Amaziah king of Judah became king. He was sixteen years old when he came to the throne, and he reigned in Jerusalem for fifty-two years; his mother was Jecoliah of Jerusalem. He did what was right in the eyes of the Lord, as Amaziah his father had done. But the hill-shrines were allowed to remain; the people still continued to slaughter and burn sacrifices there. The Lord struck the king with leprosy, which he had till the day of his death; he was relieved of all his duties and lived in his own house, while his son Jotham was comptroller of the household and regent. The other acts and events of Azariah's reign are recorded in the annals of the kings of Judah. So he rested with his forefathers and was buried with them in the city of David; and he was succeeded by his son Jotham".

בשנת עשרים ושבע שנה לירבעם מלך ישראל מלך ישראל מלך עזריה בן-אמציה מלך יהודה: בן-שש עשרה שנה היה במלכו וחמשים ושתים שנה מלך בירושלם ושם אמו יכליהו מירושלם: ויעש הישר בעיני יהוה ככל אשר-עשה אמציהו אביו: רק הבמות לא-סרו עוד העם מזבחים ומקטרים בבמות: וינגע יהוה את-המלך ויהי מצרע עד-יום מותו וישב בבית החפשיית ויותם בן-המלך עליהבית שפט את-העם הארץ: ויתר דברי עזריהו וכל-אשר עשה הלאהם כתובים על-ספר דברי הימים למלכי יהודה: וישכב עזריה עס-אבתיו ויקרבו אתו עס-אבתיו בעיר דוד וימלך יותם בנו תחתיו

If we compare the various pieces of literary evidence mentioned above — that is to say, *Amos*, *Zechariah*, *Kings*, *Chronicles*, Josephus and the rabbinical tradition of exegesis — we find that historical fact and legendary elements are superimposed on one another. And we can summarise the available data by saying that the sources speak of an earthquake at Jerusalem and in the nearby Valley of Hinnom, in the Mount of Olives area.

This earthquake, and more particularly the damage it caused to the temple in Jerusalem, is linked to the punishment which God inflicted on Uzziah king of Judah for his impious behaviour. Since we know that when king Uzziah was suffering from leprosy, Jotham became regent — around 756 (or 759) B.C. — we have a valuable piece of chronological evidence for dating the earthquake (Soggin 1970, p.120). In other words, we know that king Uzziah caught leprosy in the sixth decade of the eighth century B.C. At the time of his illness there was an earthquake, and these two unusual events were interpreted as a punishment from God. King Uzziah's place was taken by Jotham, as regent, and in the memory of the Jewish people these individual episodes became superimposed upon one another in such a way as to constitute one of the many events in the continuing history of the relationship between the God of Israel and his people. According to Ben-Menahem (1979, p.262) we can be even more precise: in his opinion, the earthquake is very likely to have occurred "at Yom-Kippur, Monday, 10

Tishrei, 3003, which is Oct. 07, 759 B.C., during day time".

It is very important to note at this stage that the historical reality of the earthquake and its approximate date have been confirmed by recent archaeological discoveries. Excavations carried out by the Israeli archaeologist Y.Yadin in 1956 at the Hazor site revealed traces of an upheaval of the earth which caused serious damage and a sudden interruption to the building of the settlement. Stratigraphic evidence suggests that the earthquake is likely to have occurred around 760 B.C. Hazor was in northern Galilee, and is to be identified with present day Tell al-Qidāh (or Tell Waqqās), 14 km north of Lake Tiberias. Traces of the earthquake were found in the sixth stratum of the upper city (8th century B.C.); see Yadin (1961, p.24, note 73). There is further evidence of this from recent excavations at Gezer. Dever (1992) has in fact attributed to the earthquake of c.760 B.C. signs of sudden destruction found in a defensive wall (an Iron Age addition to the Late Bronze Age walls: 1990 season of excavations).

< 002 > **c.550 B.C. ● Sparta, ○ Mt.Taygetus ▷ landslide ◁**

- sources 1 Cic. *De div.* 1.112
- sources 2 Strabo 8.5.7; Plin. *n.h.* 2.191
- literature Cartledge (1979); Ducat (1984); Panessa (1991)
- catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Galanopoulos (1961); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

In his *De divinatione*, Cicero mentions an earthquake which destroyed the city of Sparta and caused part of Mt.Taygetus to collapse. The occurrence can be linked to the presence of the philosopher Anaximander in Sparta in the mid-6th century B.C., when he is said to have warned the Spartans of the possibility of landslides from the upper slopes of Mt.Taygetus (Panessa 1991, pp.368-9): "Doctors, helmsmen and farmers, too, have many presentiments, but I do not call any of these divinations, nor that warning given to the Spartans by the natural philosopher Anaximander to leave the city and their houses and to keep armed watch in the fields, because there would soon be an earthquake. Shortly afterwards, the whole city was reduced to ruins, and a piece of the summit of Mt.Taygetus, shaped like the stern of a ship, broke off".

Multa medici, multa gubernatores, agricolae etiam multa praesentiunt, sed nullam eorum divinationem voco, ne illam quidem qua ab Anaximandro physico moniti Lacedaemonii sunt ut urbem et tecta linquerent armatique in agro excubarent, quod terrae motus instaret, tum cum et urbs tota corruiet et e monte Taygeto extrema montis quasi puppis avolsa est.

The same anecdote is repeated by Strabo and Pliny. Cartledge (1979, p.309), a historian of Sparta, confirms the dating to the mid-6th century on historical grounds, and attributes Sparta's abandonment of an aggressive policy to a fall in the population after the earthquake. Ducat (1984, p.76), on the other hand, tries to relate these pieces of evidence to the major earthquake which occurred around 464 (see entry < 008 >), pointing out that Plutarch (*Cim.* 16) also mentions the peak of Mt.Taygetus collapsing. But it is difficult to see why the mountain should not have been subject to more than one landslide; and there are no stylistic similarities between Plutarch and Cicero such as to suggest that we ought to eliminate this earthquake.

< 003 > **c.550 B.C. the island of Syros**

- sources Theopomp. *FGrHist* 115 F 71; Apollon. *Hist. mir.* 5.1; Cic. *De div.* 1.112; Plin. *n.h.* 2.191; *Paradox. Vat.* 30
- literature Panessa (1991)
- catalogues Bonito (1691); Guidoboni (1989)

Numerous sources tell how Pherecydes predicted an earthquake after drinking water from a well. Theopompus of Chios and Apollonius say that the earthquake did indeed occur two days later, and that Pherecydes became famous as a result.

Theopompus writes: "Pherecydes, son of Babys, was a native of Syros [...] Theopompus declares that he was the first to write about nature and the gods. Many wonderful things are told about him [...] and after drinking water drawn from a well he predicted that there would be an earthquake two days later; and indeed there was".

Φερεκύδης Βάβυος Σύριος [...] τοῦτόν φησι Θεόπομπος πρῶτον περὶ φύσεως καὶ θεῶν γράψαι. πολλὰ δὲ καὶ θαυμάσια λέγεται περὶ αὐτοῦ [...] καὶ ἀνιμνηθέντος ἐκ φρέατος ὕδατος πίνοντα προειπεῖν ὥς εἰς τρίτην ἡμέραν ἔσοιτο σεισμός· καὶ γενέσθαι.

Apollonius writes: "Here are some of the tales told of Pherecydes. Once on the island of Syros, he felt thirsty and asked someone he knew for a drink of water; and after drinking, he said there would be an earthquake on the island two days later. Since it did indeed occur, he became very famous".

Τὰ δὲ περὶ Φερεκύδην τοιαῦτά τινα ἱστορεῖται. ἐν Σύρῳ ποτὲ τῇ νήσῳ διψῶντα ὕδατιον αἰτῆσαι παρὰ τινος τῶν γνωρίμων· τὸν δὲ πίνοντα εἰπεῖν σεισμόν ἐσόμενον ἐν τῇ νήσῳ μετὰ τρίτην ἡμέραν. τούτου δὲ συμβάντος μεγάλην δόξαν αὐτὸν ἀπενέγκασθαι.

Other sources tell of Pherecydes' prediction without saying whether the earthquake actually occurred or not. In his *De divinatione*, Cicero writes: "Nor is Pherecydes, the teacher of Pythagoras, to be considered a diviner rather than a natural philosopher, for having said that there would soon be an earthquake, after looking at water drawn from a perennial well".

Ne Pherecydes quidem, ille Pythagorae magister, potius divinus habebitur quam physicus, quod cum vidisset haustam aquam de iugi puteo terrae motus dixit instare.

Pliny tells us that Pherecydes made the prediction to his fellow citizens, which presumably means to the people of his native island of Syros: "Another prediction is attributed to Pherecydes, the teacher of Pythagoras, but it was of a divinatory kind; for he had a premonition of an earthquake after drawing water from a well, and predicted it to his fellow citizens".

Perhibetur et Pherecydi, Pythagorae doctore, alia coniectatio, sed et illa divina, haustu aquae e puteo praesensisse ac praedixisse civibus terrae motum.

The Vatican Paradoxographer tells us that "Pherecydes of Syros, after drinking water from a spring on the island, became very expert at predicting the future, and he predicted some earthquakes and other occurrences".

Φερεκύδης ὁ Σύριος ἀπὸ τινος ἐν Σύρῳ τῇ νήσῳ πηγῆς ὕδωρ πιὼν μαντικώτατος γέγονε καὶ τινὰς προεμήνυσε σεισμούς καὶ ἄλλα.

Theopompus' reference to a well as an "observatory" for predicting earthquakes has precedents both in Thales' suggestion that earthquakes are caused by water, and in the ancients' awareness of the relationship between water levels in wells, the behaviour of springs, and earthquakes (Panessa 1991, pp.336-8).

< 004 > c.490 B.C. the island of Delos

sources Hdt. 6.98.1-3

literature Macan (1895); Momigliano (1930); Popp (1959); Autino (1987); Panessa (1991)

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a); Capelle (1924); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

There is a much debated "seismological tradition" concerning the sacred island of Delos. Herodotus tells us that the only earthquake felt by the Delians occurred around 490 B.C.: "After he [Datis] had put out to sea, there was an earthquake at Delos — the first and last before my time, according to the Delians. This was surely sent by the god as an omen of the ills which were going to occur [...]. There was therefore nothing strange about the fact that it should now be struck by an earthquake for the first time. And there was also an oracle about Delos, which said: 'I will shake even Delos, though it has never been shaken before'".

Μετὰ δὲ τοῦτον ἐνθεῦτεν ἔξαναχθέντα Δῆλος ἐκινήθη, ὡς ἔλεγον οἱ Δῆλιοι, καὶ πρῶτα καὶ ὕστατα μέχρι ἐμεῦ σεισθεῖσα. καὶ τοῦτο μὲν κου τέρας ἀνθρώποισι τῶν μελλόντων ἔσεσθαι κακῶν ἔφαινε ὁ θεός [...] οὕτω οὐδὲν ἦν ἀεικὲς κινήθῃναι Δῆλον τὸ πρὶν εἶσσαν ἀκίνητον. καὶ ἐν χρησμῷ ἦν γεγραμμένον περὶ αὐτῆς ὥδε· κινήσω καὶ Δῆλον ἀκίνητόν περ εἶσσαν.

In those days, such a matter was not without importance, because Delos was renowned for the pan-Hellenic cult of Apollo, and so held to be exempt from earthquakes, in accordance with an ancient belief recorded as early as the time of Pindar (fr. 52d Snell). But a number of authors, while aware of this ancient tradition, nevertheless maintain that the island was struck by earthquakes, which were interpreted as foretelling imminent catastrophes (see also entries <023> and <066>).

The sacred nature of Delos, and its particular geographical position, made it an ideal point of reference for 5th century B.C. Athenian imperialism, the temple acting as a sort of fulcrum for social equilibrium. (There is a tradition recorded by Macrobius, *sat.* 3.6.7, that a man called Epaphus, about whom we have no other information, investigated the matter). Of all the earthquakes felt at Delos, therefore (and they must have been frequent, given the seismicity of the Cyclades), the only ones to be recorded were those which could be linked by the Greeks to some particularly catastrophic event.

Autino (1987, p.409), however, thinks that the comparative freedom of Delos from earthquakes can also be explained scientifically.

The particular position of Delos explains why the Herodotean tradition concerning the "first" earthquake was refuted by that other great historian of the 5th century, Thucydides. He contradicts Herodotus by maintaining that the first earthquake to be felt at Delos occurred in 431 B.C., shortly before the beginning of the Peloponnesian War (see entry <011>). According to Momigliano (1930), Thucydides had this very passage from Herodotus in mind, and was openly contradicting him in an attempt to correct the date for the earthquake. On the other hand, there is no reason to reject the view of Herodotus; for though he was still alive at the outbreak of the Peloponnesian War (the *terminus ante quem* for his life is 430 B.C.), the information about Delos must have been acquired before 431, and hence the earthquake of 490 could, at that time, have been taken as the "first" earthquake recorded at Delos (see Macan 1895, p.353). Herodotus' history was written at Thurii in southern Italy; so it is by no means clear how he could have come to know about an earthquake at Delos in 431 B.C., even though it was regarded as a prodigy in Delos temple circles. In our view, Momigliano's brilliant argument (1930) lacks supporting evidence and cannot stand on its own. As for Thucydides' reticence on the matter, see the hypothesis set out in entry <011>.

There was another — equally debated — earthquake at Aegina, which should perhaps be considered in relation to this one, even though Herodotus himself does not appear to have done so (see entry <005>). In both cases, the seismic activity involved was minor, and was recorded by Herodotus' sources (which were not averse to accepting oral evidence) because of their significance as prodigies. Herodotus, on the other hand, was more interested in the earthquakes as natural phenomena than as por-

tents. This may explain Thucydides' unwillingness to take the evidence about an earthquake at Delos into consideration: he may simply not have found reliable support for it. In any case, Thucydides, as a historian, was highly critical of Herodotus, and the latter's "mendacity" became a *topos* in Greek historiography. It was natural, therefore, that Thucydides should modify Herodotus' account.

<005> **January–March 490 or 489/488 B.C. the island of Aegina**

sources Hdt. 5.85.1-2, 5.86.4

literature Andrewes (1936-37); Hammond (1955); Jeffery (1962); Virgilio (1972); Panessa (1991)

catalogues Capelle (1924); Guidoboni (1989)

Herodotus tells us that there was an earthquake on the island of Aegina during the war between it and Athens; and he gives the versions of both sides as to what happened (5.85.1-2): "The Athenian version of events is that after they had received this request, they sent a trireme with some of their fellow citizens, and when they arrived at Aegina, since they had been sent on behalf of the state, they tried to remove the statues from their bases and carry them off, on the grounds that they were their property, being made of Attic wood. But since this method did not work, they fastened ropes round the statues and tried to drag them away, only to find that as they did so there came a clap of thunder and an earthquake. The men from the trireme were so deranged by this that they began to kill one another as enemies, until there was only one survivor to return to Phalerum".

Ἀθηναῖοι μὲν νυν λέγουσι μετὰ τὴν ἀπαίτησιν ἀποσταλῆναι τριήρει μὴ τῶν ἀστῶν [τούτους] οἱ ἀποπεμφθέντες ἀπὸ τοῦ κοινοῦ καὶ ἀπικόμενοι ἐς Αἶγιναν τὰ ἀγάλματα ταῦτα ὡς σφετέρων ξύλων ἔοντα ἐπειρῶντο ἐκ τῶν βάθρων ἐξανασπᾶν, ἵνα σφέα ἀνακομίσωνται. οὐ δυναμένους δὲ τούτῳ τῷ τρόπῳ αὐτῶν κρατῆσαι, περιβαλόντας σχοινία ἔλκειν τὰ ἀγάλματα, καὶ σφι ἔλκουσι βροντὴν τε καὶ ἅμα τῇ βροντῇ σεισμὸν ἐπιγενέσθαι· τοὺς δὲ τριηρίτας τοὺς ἔλκοντας ὑπὸ τούτων ἀλλοφρονῆσαι, παθόντας δὲ τοῦτο κτείνειν ἀλλήλους ἅτε πολεμίους, ἐς ὃ ἐκ πάντων ἓνα λειφθέντα ἀνακομισθῆναι αὐτὸν ἐς Φάληρον.

The Aeginetan version, on the other hand, was that the Athenians had decided to attack not with a single vessel but a whole fleet. Herodotus writes (5.86.4): "But the Aeginetans say that when they learned that the Athenians were about to mount an expedition against them, they made sure they would get help from the Argives. So when the Athenians disembarked on Aegina, the Argives came to their aid, crossing over secretly from Epidaurus to the island, taking the Athenians by surprise and cutting them off from their ships. That was the moment when the thunder and earthquake occurred".

Ἀθηναίους μὲν δὴ ταῦτα ποιεῖν, σφέας δὲ Αἰγινῆται λέγουσι, πυθομένους τοὺς Ἀθηναίους ὡς μέλλοιεν ἐπὶ σφέας στρατεύεσθαι, ἐτοίμους Ἀργεῖους ποιέεσθαι. τοὺς τε δὴ Ἀθηναίους ἀποβεβάναι ἐς τὴν Αἰγιναίην καὶ παρεῖναι βοηθέοντας σφίσι τοὺς Ἀργεῖους καὶ λαθεῖν τε ἐξ Ἐπιδαύρου διαβάντας ἐς τὴν νῆσον καὶ οὐ προακηκοόσι τοῖσι Ἀθηναίοισι ἐπιπσεῖν ὑποταγομένους τὸ ἀπὸ τῶν νεῶν, ἅμα τε ἐν τούτῳ τὴν βροντὴν τε γενέσθαι καὶ τὸν σεισμὸν αὐτοῖσι.

Capelle (1924, col.350) casts doubt on the earthquake; and there is also disagreement as to the date of the war in question. Some place it immediately before the battle of Marathon (Hammond 1955, pp.406-11; Jeffery 1962; Virgilio 1972, pp.457ff.), while others date it to 489/488 B.C., shortly after the battle (Andrewes 1936-37).

<006> **at sunrise on 29 September 480 B.C. Salamis (Greece)**

▷seismic sea-wave?◁

sources Hdt. 8.64.1-2

literature Panessa (1991)

catalogues Schmidt (1881); Papazachos and Papazachos (1989); Guidoboni (1989)

According to Herodotus, an earthquake was felt at Salamis, both on land and at sea, on the day of the battle between Greeks and Persians: "At sunrise the next day there was an earthquake on land and at sea; and so the Greeks decided to pray to the gods, and to call on the sons of Aeacus for help. This they did: they prayed to all the gods, and called on Aias and Telamon to come to them from Salamis; and they sent a ship to Aegina for the statues of Aeacus and his sons".

Ἡμέρη τε ἐγένετο καὶ ἅμα τῷ ἡλίῳ ἀνιόντι σεισμὸς ἐγένετο ἐν τε τῇ γῇ καὶ τῇ θαλάσῃ. ἔδοξε δέ σφι εὖξασθαι τοῖσι θεοῖσι καὶ ἐπικαλέσασθαι τοὺς Αἰακίδας συμμαχοῦς. ὥς δέ σφι ἔδοξε, καὶ ἐποίησαν ταῦτα· εὖξάμενοι γὰρ πᾶσι τοῖσι θεοῖσι αὐτόθεν μὲν ἐκ Σαλαμῖνος Αἴαντά τε καὶ Τελαμῶνα ἐπεκαλέοντο, ἐπὶ δὲ Αἰακὸν καὶ τοὺς ἄλλους Αἰακίδας νέα ἀπέστελλον ἐς Αἴγινα.

On this occasion, earthquake and seismic sea-wave marked the beginning of the day's epic events. Such occurrences are not unknown at Salamis, but are on a strictly local scale. An event of this kind, however, was interpreted in the Greek world as a sign from the gods, and its significance was increased by the imminence of the naval battle against the Persians. There is no indication, however, as to whether in these circumstances the sign was favourable or unfavourable for the Greeks. The prayers and supplications after the earthquake seem to have been related to it and, in the light of similar Spartan experiences, it may have been seen as a sign of divine disapproval of the invading Persians (Panessa 1991, p.342).

<007> **479 B.C. Potidaea** ▷seismic sea-wave?◁

sources Hdt. 8.129.1-2

literature Smid (1970); Bousquet and Péchoux (1981); Panessa (1991)

catalogues Schmidt (1881); Capelle (1924); Heck (1947); Galanopoulos (1960); Galanopoulos (1961); Ambraseys (1962 b); Shebalin *et al.* (1974); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

According to Herodotus, a great tidal wave — which we can perhaps identify as a seismic sea-wave — caused a Persian attack on Potidaea to fail: "Three months after Artabazus laid siege to Potidaea, there was a great ebb-tide in the sea, which lasted for a long time. When the foreigners saw that the sea had become a marsh, they made their way across it towards Pallene. But when they had crossed two fifths of it and three fifths remained before they could reach Pallene, a great flood-tide occurred — greater than any of the many preceding ones, according to the local people. Those who could not swim were drowned, and those who could were killed by the Potidaeans, who attacked them from boats".

Ἀρταβάζω δὲ ἐπειδὴ πολιορκέοντι ἐγεγόνεσαν τρεῖς μῆνες, γίνεται ἄμπωτις τῆς θαλάσσης μεγάλη καὶ χρόνον ἐπὶ πολλόν. ἰδόντες δὲ οἱ βάρβαροι τέναγος γενόμενον παρήσαν ἐς τὴν Παλλήνην. ὥς δὲ τὰς δύο μὲν μοῖρας διοδοιπορήκεσαν, ἔτι δὲ τρεῖς ὑπόλοιποι ἦσαν, τὰς διελθόντας χρῆν εἶναι ἔσω ἐν τῇ Παλλήνῃ, ἐπῆλθε πλημυρὶς τῆς θαλάσσης μεγάλη, ὅση οὐδαμὰ κω, ὥς οἱ ἐπιχώριοι λέγουσι, πολλάκις γινομένης. οἱ μὲν δὴ νέειν αὐτῶν οὐκ ἐπιστάμενοι διεφθείροντο, τοὺς δὲ ἐπισταμένους οἱ Ποτειδαῖται ἐπιπλώσαντες πλοίοισι ἀπώλεσαν.

Capelle (1924, col.348) thinks that the context suggests a legend; Bousquet and Péchoux (1981, p.47) think that the sea-wave was caused by an earthquake.

<008> **469-464 B.C. • Sparta ▷landslides, subsidence◁**

- sources 1 Thuc. 1.101.1-2, 1.128.1, 2.27.2; Diod. 11.63.1-4, 15.66.4; Plut. *Cim.* 16.4-5, *Lyc.* 28.11-2;
sources 2 Paus. 4.24.5-6; *Schol. Aristoph. Lys.* 1142, 1144; Ael. *VH* 6.7
literature Ziehen (1933); Chrimes (1949); Papantoniou (1951); Hammond (1955); Sealey (1957);
Hammond (1959); Cartledge (1976, 1979); Cozzoli (1979); Baladié (1980); Ducat (1984);
Autino (1987); Panessa (1991); Armijo *et al.* (1991)
catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881);
Galanopoulos (1961); Shebalin *et al.* (1974); Comninakis and Papazachos (1982);
Papazachos and Papazachos (1989); Guidoboni (1989)

This earthquake is recorded in a number of different sources, and was considered to be of "epoch-making" importance, because it occurred at a time when the balance of power between Sparta and Athens was in a delicate state. It took Sparta by surprise, and immediately led to internal and external uprisings by its subject peoples. There followed the third war between Sparta and Messenia, known as the "earthquake war". The various references in Thucydides stress the role of the Helots of Laconia and Messenia in the uprising which followed the earthquake. He mentions (1.101.1-2) that the Thasians had sought the help of Sparta against the Athenians: "Since the Thasians had been defeated in battle and were now beseiged, they called on the Spartans to help them by invading Attica. They agreed to do this, without the Athenians finding out, and were about to keep their promise when they were prevented from doing so by an earthquake, during which the Helots and the Perioeci of Thuria and Aethaea rose up in rebellion and went to Ithome".

Θάσιοι δὲ νικηθέντες μάχη καὶ πολιορκούμενοι Λακεδαιμονίους ἐπεκαλοῦντο καὶ ἐπαμύνειν ἐκέλευον ἐσβαλόντας ἐς τὴν Ἀττικὴν. οἱ δὲ ὑπέσχοντο μὲν κρύφα τῶν Ἀθηναίων καὶ ἔμελλον, διεκωλύθησαν δὲ ὑπὸ τοῦ γενομένου σεισμοῦ, ἐν τῷ καὶ οἱ Εἰλωτες αὐτοῖς καὶ τῶν περιόικων Θουριᾶται τε καὶ Αἰθαίης ἐς Ἰθώμην ἀπέστησαν.

There is another reference to this major earthquake at 1.128.1: "The Athenians replied by demanding that the Spartans should drive out the curse of Taenarus. For on one occasion, the Spartans had caused some suppliant Helots to leave their refuge in the temple of Poseidon and had taken them away and killed them; and the Spartans believe that this was the cause of the great earthquake being sent against them at Sparta".

Ἀντεκέλευον δὲ καὶ οἱ Ἀθηναῖοι τοὺς Λακεδαιμονίους τὸ ἀπὸ Ταινάρου ἄγος ἐλαύνειν· οἱ γὰρ Λακεδαιμόνιοι ἀναστήσαντές ποτε ἐκ τοῦ ἱεροῦ τοῦ Ποσειδῶνος [ἀπὸ Ταινάρου] τῶν Εἰλώτων ἰκέτας ἀπαγαγόντες διέφθειραν, δι' ὃ δὴ καὶ σφίσιν αὐτοῖς νομίζουσι τὸν μέγαν σεισμὸν γενέσθαι ἐν Σπάρτῃ.

(See also Thuc. 2.27.2, and the reference to the anger of Poseidon in Paus. 4.24.6 — a passage largely based on Thucydides).

Diodorus (11.63.1-4) provides more detailed information: "These, then, were the events of this year. When Phaeon was archon in Athens, the consulship in Rome was taken over by Lucius Furius Mediolanus and Marcus Manilius Vaso. During the year, a great and extraordinary catastrophe struck the Spartans, for violent earthquakes occurred in their city, so that houses completely collapsed and more than twenty thousand Spartans were killed. Since the city was shaken and many houses collapsed over a long period of time without respite, many people were caught and crushed by collapsing walls, and a great deal of household property was destroyed. They suffered

this disaster because, it seemed, some god was venting his anger on them, but they also had to face dangers of human origin, as is set out below. Although the Helots and Messenians were enemies of the Spartans, they had remained quiet up to now, because they were afraid of Sparta's overweening power; but when they saw that a majority of Spartans had perished in the earthquake, they felt contempt for the few survivors. So they came to an agreement and waged a joint war against the Spartans".

Ταῦτα μὲν οὖν ἐπράχθη κατὰ τοῦτον τὸν ἐνιαυτόν. ἐπ' ἄρχοντος δ' Ἀθήνησι Φαίωνος ἐν Ῥώμῃ τὴν ὑπατον ἀρχὴν διεδέξαντο Λεύκιος Φούριος Μεδιολανὸς καὶ Μάρκος Μανίλιος Οὐάσων. ἐπὶ δὲ τούτων μεγάλη τις καὶ παράδοξος ἐγένετο συμφορὰ τοῖς Λακεδαιμονίοις· ἐν γὰρ τῇ Σπάρτῃ γενομένων σεισμῶν μεγάλων συνέβη πεσεῖν τὰς οἰκίας ἐκ θεμελίων καὶ τῶν Λακεδαιμονίων πλείους τῶν δισμυρίων φθαρῆναι. ἐπὶ πολὺν δὲ χρόνον συνεχῶς τῆς πόλεως καταφερομένης καὶ τῶν οἰκιῶν πιπτουσῶν πολλὰ σώματα τοῖς πτώμασι τῶν τοίχων ἀπολαμβανόμενα διεφθάρη, οὐκ ὀλίγον δὲ τῶν κατὰ τὰς οἰκίας χρημάτων ὁ σεισμὸς ἐλυμήνατο. καὶ τοῦτο μὲν κακὸν ὥσπερ δαιμονίου τινὸς νεμεσήσαντος αὐτοῖς ἔπαθον, ἄλλους δὲ κινδύνους ὑπ' ἀνθρώπων αὐτοῖς συνέβη γενέσθαι διὰ τοιαύτας αἰτίας. Εἰλωτες καὶ Μεσσηνιοὶ πρὸς Λακεδαιμονίους ἀλλοτρίως ἔχοντες τὸ μὲν πρὸ τοῦ ἡσυχίαν εἶχον, φοβούμενοι τὴν τῆς Σπάρτης ὑπεροχὴν τε καὶ δύναμιν· ἐπεὶ δὲ διὰ τὸν σεισμόν ἐώρων τοὺς πλείους αὐτῶν ἀπολωλότας, κατεφρόνησαν τῶν ἀπολελειμμένων, ὀλίγων ὄντων. διόπερ πρὸς ἀλλήλους συνθέμενοι κοινῇ τὸν πόλεμον ἐξήνεγκαν τὸν πρὸς τοὺς Λακεδαιμονίους.

In another passage (15.66.4), Diodorus also says: "The last war between them [the Spartans and Messenians] broke out on the occasion of a great earthquake. Practically the whole of Sparta was destroyed and deprived of men, so the surviving Messenians joined with the Helots who had helped them in the revolt, and settled Ithome after Messenia had been desolate for a long time".

Ὁ δ' ὕστατος ἐγένετο πόλεμος αὐτοῖς, σεισμοῦ μεγάλου γενομένου καὶ τῆς μὲν Σπάρτης ὅλης σχεδὸν συγχυθείσης, ἀνδρῶν δ' ἐρήμου γενομένης, οἱ Μεσσηνίων περιλειφθέντες ᾤκισαν τὴν Ἰθώμην μετὰ τῶν συναποστατῶν Εἰλωτῶν, ἀναστάτου γεγεννημένης τῆς Μεσσηνίας πολλοὺς χρόνους.

In his *Life of Lycurgus* (28.11-2), Plutarch repeats that Helots and Messenians joined forces after the great earthquake: "Those who say that in Sparta the freeman is more a freeman than anywhere else in the world, and the slave more a slave, are quite right. In my opinion, however, the Spartans began to practise these cruelties later on, particularly after the great earthquake, when they say the Helots and Messenians together attacked the Spartans, causing widespread damage in the area and putting their city in great danger".

Ὡστε τοὺς λέγοντας ἐν Λακεδαίμονι καὶ τὸν ἐλεύθερον μάλιστ' ἐλεύθερον εἶναι καὶ τὸν δοῦλον μάλιστα δοῦλον, οὐ ψαύλως τεθεωρηκέναι τὴν διαφορὰν. τὰς μὲν οὖν τοιαύτας χαλεπότητας ὕστερον ἐγγενέσθαι τοῖς Σπαρτιάταις νομίζω, μάλιστα δὲ μετὰ τὸν μέγαν σεισμόν, ᾧ συνεπιθέσθαι τοὺς εἰλωτας μετὰ Μεσσηνίων ἱστοροῦσι, καὶ πλεῖστα κακὰ τὴν χώραν ἐργάσασθαι, καὶ μέγιστον τῇ πόλει περιστῆσαι κίνδυνον.

In the *Life of Cimon* (16.4-5) we read: "When Archidamus, son of Zeuxidamus, was in the fourth year of his reign at Sparta, a more violent earthquake than any previously experienced opened up a great many chasms in Spartan territory, and so shook Mt. Taygetus that a number of peaks were torn away, and the whole city was destroyed, with the exception of five houses. They say that shortly before the earthquake shocks began, some young men and youths were exercising together under a colonnade, when a hare suddenly appeared, and covered in oil as they were, the

youths chased after it for fun; but the young men stayed behind, and the building collapsed on top of them, killing them all. Even today their tomb is called *Seismatias*".

Ἀρχιδάμου τοῦ Ζευξιδάμου τέταρτον ἔτος ἐν Σπάρτῃ βασιλεύοντος, ὑπὸ σειсмоῦ μεγίστου δὴ τῶν μνημονευομένων πρότερον ἢ τε χώρα τῶν Λακεδαιμονίων χάσμασιν ἐνώλισθε πολλοῖς, καὶ τῶν Ταυγέτων τιναχθέντων κορυφαί τινες ἀπερράγησαν αὐτῇ δ' ἡ πόλις ὅλη συνεχύθη πλὴν οἰκιῶν πέντε, τὰς δ' ἄλλας ἤρειψεν ὁ σεισμός. ἐν δὲ μέσῃ τῇ στοᾷ γυμναζομένων ὁμοῦ τῶν ἐφήβων καὶ τῶν νεανίσκων λέγεται μικρὸν πρὸ τοῦ σειсмоῦ λαγὼν παραφανῆναι, καὶ τοὺς μὲν νεανίσκους ὥσπερ ἦσαν ἀλληλιμμένοι μετὰ παιδιᾶς ἐκδραμεῖν καὶ διώκειν, τοῖς δ' ἐφήβοις ὑπολειφθεῖσιν ἐπιπεσεῖν τὸ γυμνάσιον καὶ πάντας ὁμοῦ τελευτῆσαι. τὸν δὲ τάφον αὐτῶν ἔτι νῦν Σεισματίαν προσαγορεύουσι.

This is the context in which Plutarch links the landslide on Mt. Taygetus and the earthquake of 550 B.C. He is probably using local traditions when he brings together these two events in this way, uniting them under the one which was better known, or better documented.

As the sources make clear, the earthquake was a severe blow for Sparta: the destruction of property and the loss of twenty thousand citizens (it has been estimated that half the population of the city was killed: see Ducat 1984, p.79) was a very serious matter. While it is less certain that the earthquake led to a demographic decline (see the objections made by Cartledge 1979, p.222 and Ducat 1984, p.79), there is no doubt that subsequent events led to a crisis. Furthermore, Spartan tradition relied on a fixed number of citizens — originally nine thousand. This conservative tendency was typical of Sparta and had its influence on demography. It is likely, however, that the figure of twenty thousand dead also included slaves (Cozzoli 1979, p.62).

In our opinion, however, historians have not paid sufficient attention to the question of the degree of severity of the earthquake. The fact is that, by tradition, the Spartans lived not in a built-up city surrounded by walls, but "village-fashion, in the old Hellenic style" (Thuc. 1.10.2). It is unlikely that there were any high buildings, because severe laws prevented the Spartans from using tools other than axes for building roofs (Chrimes 1949, p.352). On the one hand, therefore, it is possible to accept Chrimes' view (1949, p.352) that the figure of twenty thousand victims is an anachronism; but on the other, it is always possible that the earthquake affected a very large area, and that the high figure given for the dead is more or less accurate.

Another problem is the assessment of the sources. Ducat (1984, p.79) has pointed out that while Thucydides gives a succinct account of the event (in his usual way), it is the later sources, such as Plutarch, which add telling details (it seems unlikely, however, that the tradition concerning the 6th century earthquake, see entry <002>, can be integrated with this one, as Ducat 1984, p.76 suggests).

One particularly tricky problem is the question of dating the earthquake, for the ancient sources are not in agreement on the matter. Thucydides gives 465/4 or 464/3, Diodorus 469/8, Plutarch 466/5, and Pausanias 464/3.

The chronology of this period is much debated amongst scholars. For a discussion of the question, see Ducat (1984) and Autino (1987, especially p.368, note 22). The most recent studies, however, show a tendency to date the earthquake to 464 (see Panessa 1991, p.369). It is always possible, nevertheless, that a first series of shocks occurred around 469/8 (Hammond 1955; Sealey 1957 expressed scepticism, and Hammond replied in 1959), as the evidence provided by Diodorus would seem to suggest.

Recent research involving satellite images and fieldwork (Armijo *et al.* 1991) has identified a 20-km-long normal fault scarp a few kilometres east of the ancient city of Sparta. By combining their observations with an analysis of historical descriptions of the earthquake, these scholars have estimated that its magnitude was $M_s \approx 7.2$.

<009> **c.461 B.C. Rome?**

sources Liv. 3.10.6; Dionys. Hal. 10.2.3

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); Abbati (1703); von Hoff (1840); Mallet (1853); Schmidt (1881); Nissen (1883); Mercalli (1883); Galli (1906); Guidoboni (1989)

This is the earliest datable earthquake in Italy. As in the case of other earthquakes in Rome and Italy for which there is evidence in archaic and mid-republican times (5th-3rd century B.C.), no sources for this earthquake are anything like contemporary; but the Augustan writers who record it, namely Livy and Dionysius of Halicarnassus, are using reliable annals as their sources. The earthquake was at any rate a very early one; and while there are no doubts about its authenticity, we have to be rather more cautious as to its actual date.

Livy tells us that during the consulship of Publius Volumnius and Servius Sulpicius "the earth was shaken by a severe tremor".

terra ingenti concussa motu est.

According to Dionysius of Halicarnassus, several earthquakes took place in close succession that year. He lists some portents sent by the gods, including "rumblings and the repeated shaking of the earth".

Γῆς τε μυχήματα καὶ τρόμοι.

This earthquake and other prodigies led to the consultation of the *Sibylline Books*: it was prophesied that foreign peoples would threaten Rome, and that the Romans would be involved in a new war. The earthquake must have occurred at Rome, because Livy mentions it in the context of prodigies there in that year. In any case, the date makes it impossible for him to have intended a reference to Italic or even Latin regions, since at that time the tradition of augury was limited to Rome and its immediate hinterland.

<010> **c.436 B.C. •central Italy?**

sources 1 Liv. 4.21.5; Oros. *Hist.* 2.13.8

sources 2 Land. Sagax *Hist. Rom.* 1.20-1

literature Lippold (1976)

catalogues Bonito (1691); Abbati (1703); von Hoff (1840); Mallet (1853); Schmidt (1881); Mercalli (1883); Galli (1906); Guidoboni (1989)

This is another case of one or more seismic events recorded by much later writers; but their source was a very good one. According to Livy, frequent earthquake tremors, along with other prodigies, occurred during the consulship of Marcus Cornelius Maluginensis and Lucius Papirius Crassus in the countryside (near Rome?), and a number of buildings were destroyed: "in particular that frequent earthquakes were reported to have destroyed farm buildings".

maxime quod crebris motibus terrae ruere in agris nuntiabantur tecta.

Orosius records that news reached Rome of earthquakes having struck various Italian cities, and he specifies that the tremors were particularly severe and frequent, and that they lasted for almost a whole year: "In the one hundred and third and one hundred and fifth Olympiads, earthquakes occurred in Italy for almost a whole year, and they were so frequent and severe that Rome was wearied by the constant reports of innumerable tremors, and of the destruction of villas and towns".

Tertia et quinta post centesimam olympiade per totum fere annum tam crebri tamque

etiam graves in Italia terrae motus fuerunt, ut de innumeris quassationibus ac ruinis villarum oppidorumque adsiduis Roma nuntiis fatigaretur.

All this was accompanied by a terrible plague, and caused the *duumviri* to order public expiatory prayers. Neither Livy nor Orosius specifically mentions Rome as having been struck by the earthquake.

As regards the date, there is a discrepancy between Livy's mention of the 436 B.C. consuls and Orosius' reference to the 103rd and 105th Olympiads. The war which Orosius records in the same passage, shortly after mentioning the earthquakes, is the war of 426 B.C. against the people of Fidenae. His dating must therefore be wrong. He makes frequent use of Livy for the republican period and, though perhaps only for a few chapters, he is known to have used Livy's complete work, rather than the *Periochae* (summaries of Livy's books which were probably already being made from the first century B.C. onwards).

Lippold (1976, I, pp. xxxvi and 406) has suggested that amongst sources for Books I and II of Orosius' *Historiae* is a lost work by a chronicler who probably used the Olympiads for dating purposes. Orosius' mistake may in fact be due to his bringing together different sources for events and places that were actually far apart in time and location.

The fact that the earthquakes continued for so long suggests that several different seismogenetic structures were involved, or that a very severe earthquake occurred in the Apennines behind Rome.

<011> **shortly before 431 B.C. the island of Delos**

sources Thuc. 2.8.3

literature Macan (1895); Momigliano (1930); Gomme (1956); Popp (1959); Autino (1987); Panessa (1991)

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a); Capelle (1924); Guidoboni (1989)

In contradiction to what Herodotus has to say on the matter (see entry <004> above), Thucydides maintains that the first earthquake to affect Delos occurred in 431 B.C., shortly before the beginning of the Peloponnesian War: "Only a short time before, moreover, Delos had been shaken, though it had never previously suffered an earthquake within the memory of the Hellenes; but it was said and believed that this was an omen of future events".

Ἐτι δὲ Δῆλος ἐκινήθη ὀλίγον πρὸ τούτων, πρότερον οὐπω σεισθεῖσα ἀφ' οὗ Ἕλληνες μέμνηνται· ἐλέγετο δὲ καὶ ἐδόκει ἔτι τοῖς μέλλουσι γενήσεσθαι σημῆναι.

For the much debated question of earthquakes at Delos, see entry <004> above. It is naturally not a question of when the "first" earthquake occurred on the island; and in any case, there are no sound reasons for rejecting the possibility that two earthquakes occurred there at an interval of sixty years. If we keep in mind that in 426/5 B.C., the Athenians carried out a second "purification" of Delos by removing tombs (the first had been ordered in the 6th century B.C.), then we cannot exclude the purely hypothetical possibility that the earthquake of 431 B.C., interpreted as a prodigy, was one of the reasons for taking such a step; for in this way, the Athenians were reviving the religious authority of the island, and so consolidating their prestige amongst the Greeks at a particularly critical moment for the stability of their imperialism.

Thucydides (3.104.1) does not tell us what reasons the Athenians had for purifying Delos. Gomme (1956, pp. 414-5) suggests that the principal reason was a recurrence (recorded by Thucydides at 3.87) of the famous plague which struck Athens in 430. There is, however, no reason why an earthquake should not be an excellent justifica-

tion for carrying out purification; so there might be advantages in rejecting Herodotus' account of the 490 B.C. earthquake. If it could be shown that the purification was carried out after the "first" earthquake, that would provide a much better justification. This may explain Thucydides' insistence on contradicting Herodotus on the matter, as well as his shrewdness in not openly explaining the reasons for the purification. Furthermore, it was Thucydides himself (1.23.3) who, in introducing his account of the Peloponnesian War, pointed out that "the stories of old, handed down by oral tradition, but very rarely confirmed by the facts, became credible: those concerning earthquakes, for example, which affected a large part of the earth and were also extremely violent". In saying this, his most obvious allusion is certainly to the earthquake of 426 (see entry < 014 >), but the tone of the passage makes it clear that the Delos earthquake must also have been in his mind because of its rarity. What we have here, in our opinion, is confirmation that Thucydides' polemic against Herodotus over the Delos earthquake involved a subtle form of propaganda.

< 012 > **the autumn and winter of 427-426 B.C. Athens, Orchomenus, Boeotia, Euboea**

sources Thuc. 3.87.4
literature Autino (1987); Panessa (1991)
catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Galanopoulos (1961); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

A long series of seismic shocks began in central and eastern Greece in the autumn and winter of 427-6, but we have no information as to damage. Thucydides writes: "It was also at this time that the greatest number of earthquakes occurred at Athens, in Euboea and Boeotia, and especially at Orchomenus in Boeotia".

Ἐγένοντο δὲ καὶ οἱ πολλοὶ σεισμοὶ τότε τῆς γῆς, καὶ ἐν Βοιωτοῖς καὶ μάλιστα ἐν Ὀρχομενῷ τῷ Βοιωτίῳ.

The shocks continued into the spring and summer of the following year (see entry < 014 >).

< 013 > **perhaps late December of 427 B.C. Perinthus**

sources Hipp. *Epid.* 4.21
literature Deichgräber (1933); Ho Peng Yoke (1962); Autino (1987); Panessa (1991); Yeomans (1991)
catalogues Capelle (1924); Guidoboni (1989)

Hippocrates' *Epidemics* mentions an earthquake at Perinthus shortly after the winter solstice, when a star appeared: "At the winter solstice, a star of some size appeared; and on the fifth and sixth days following, there was an earthquake".

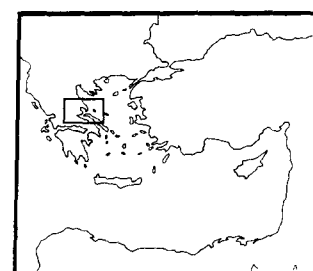
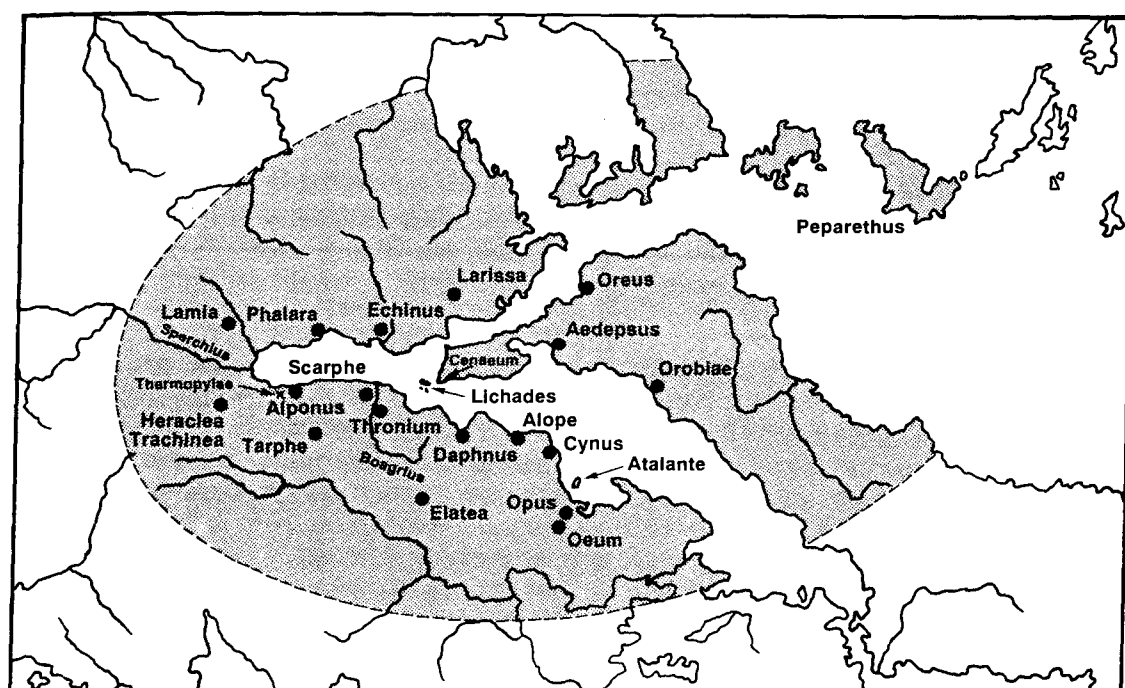
Ἡλίου χειμερινέων τροπέων ἄστρον οὐ σμικρὸν πέμπτη δ' ὕστερον καὶ ἕκτη σεισμός.

There is a great deal of disagreement amongst scholars as to the date of this earthquake. Capelle (1924, col.347) dates it to 427, whereas Deichgräber (1933) suggests a later period. He dates it to around 399-5, because it is placed in the context of the epidemic which struck Perinthus at that time.

In this instance, the mention of what seems to be an astronomical phenomenon does not help us to narrow down the date of the earthquake. In a passage in his *Meteorologica* (1.6.343 b), Aristotle mentions not only the comet which was seen shortly before the disaster at Helice and Bura in 373 B.C., but also another which was observed at Athens at the time of the archon Eucles, close to the winter solstice, during

the month of Gamelion (January-February). This may perhaps be the star mentioned in the *Epidemics*; but unfortunately, there were two archons of that name: one in 426 and another in 402 B.C. (Panessa 1991, p.304 and note 2).

However, the star mentioned in the *Epidemics* was not necessarily a comet; it may have been a nova or a supernova. But the catalogue of comets and novas observed by the Chinese (Ho Peng Yoke 1962, pp.142-3) does not report any astronomical occurrences for the period in question: just two comets are recorded: one in 433 and the other in 361 B.C. There may well be gaps in the Chinese observations for that period, however, or some may have been lost, for the comets described by Aristotle are not mentioned (Yeomans 1991, p.363).



426 B.C.

〈014〉 the summer of 426 B.C. ○Aedepeus, ●Alope, ●Alponus, ●Cynus, Daphnus, ●Echinus, ●Elatea, ●Heraclea Trachinea, ●Lamia, ●Larissa, ●Oeum, ●Opus, ●Oreus, ●Orobiae, ●Phalara, ●Scarphe, ●Tarphe, ●Thronium, ○the island of Atalante, the Lichades islands, ●the island of Peparethus, the Isthmus of Corinth, ○the Pass of Thermopylae, the Promontory of Ceneum, ○the river Boagrius, ○the river Sperchius ▷seismic sea-wave, diversion of rivers◁

sources 1 Thuc. 3.89.1-5; Demetr. Call. *FGrHist* 85 F 6; Diod. 12.59.1-2

sources 2 Eus. *Hieron. Chron.* 115f; Oros. *Hist.* 2.18.7; Georg. Sync. 489; Cedren. 255

literature Skuphos (1894); Popp (1959); Smid (1970); Autino (1987); Stiros and Dakoronia (1989); Panessa (1991); Antonopoulos (1992)

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Capelle (1924); Heck (1947); Galanopoulos (1960, 1961); Ambraseys (1962 b); Shebalin *et al.* (1974); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

This is one of the most disastrous earthquakes recorded in ancient sources. They tell of buildings collapsing, destruction caused by seismic sea-waves, and thousands of vic-

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catalogue 427-426 B.C.

tims. Various authors describe the devastating effect of the earthquake on the terrain, which was seriously affected by such a profound hydro-geological disturbance. Thucydides records that in the summer of 426 B.C., an earthquake struck the Isthmus of Corinth area and the city of Orobiae in north-west Euboea. The earthquake itself was accompanied by an extensive seismic sea-wave which affected Orobiae, the island of Atalante off the coast of Locris, and the Aegean island of Peparethus: "During the following summer, the Peloponnesians and their allies, led by Agis son of Archidamus, king of Sparta, advanced as far as the Isthmus, with the intention of invading Attica. But a great many earthquakes occurred, causing them to turn back again, and no invasion took place. It was at about the time of the earthquakes that the sea at Orobiae in Euboea receded from what was then the shore-line, only to rise up again in a great wave and engulf part of the city. Part of the water subsided and part continued to flood the land; so that what was once land is now sea. And those who did not manage to flee to high ground in time were killed. A similar flood occurred at the island of Atalante, off the coast of Opuntian Locris. It carried away part of the Athenian fort there, and wrecked one of two ships which had been drawn up on the shore. The sea also receded at Peparethus [off the north-east coast of Euboea], but there was no flood; and an earthquake knocked down part of the fort, the prytaneum and a few houses. In my opinion, the cause of the phenomenon was this: where the earthquake was most violent, the sea receded and was then pushed back with even greater violence, thus bringing about a flood. Such a thing would not have happened without an earthquake".

Τοῦ δι' ἐπιγιγνομένου θέρους Πελοποννήσιοι καὶ οἱ ξύμμαχοι μέχρι μὲν τοῦ Ἰσθμοῦ ἦλθον ὥς ἐς τὴν Ἀττικὴν ἐσβαλοῦντες, Ἀγιδος τοῦ Ἀρχιδάμου ἡγουμένου Λακεδαιμονίων βασιλέως, σεισμῶν δὲ γενομένων πολλῶν ἀπετράποντο πάλιν καὶ οὐκ ἐγένετο ἐσβολή. καὶ περὶ τούτους τοὺς χρόνους, τῶν σεισμῶν κατεχόντων, τῆς Εὐβοίαις ἐν Ὀροβίαις ἡ θάλασσα ἐπανελθοῦσα ἀπὸ τῆς τότε οὐσης γῆς καὶ κυματωθεῖσα ἐπῆλθε τῆς πόλεως μέρος τι, καὶ τὸ μὲν κατέκλυσε, τὸ δ' ὑπενόστησε, καὶ θάλασσα νῦν ἐστὶ πρότερον οὐσα γῆ· καὶ ἀνθρώπους διέφθειρεν ὅσοι μὴ ἐδύναντο φθῆναι πρὸς τὰ μετέωρα ἀναδραμόντες. καὶ περὶ Ἀταλάντην τὴν ἐπὶ Λοκροῖς τοῖς Ὀπουντίοις νῆσον παραπλησία γίγνεται ἐπὶ κλυσίς, καὶ τοῦ τε φρουρίου τῶν Ἀθηναίων παρεῖλε καὶ δύο νεῶν ἀνείλκυσμένων τὴν ἑτέραν κατέαξεν. ἐγένετο δὲ καὶ ἐν Πεπαρήθῳ κύματος ἐπαναχώρησις τις, οὐ μέντοι ἐπέκλυσε γέ· καὶ σεισμὸς τοῦ τείχους τι κατέβαλε καὶ τὸ πρυτανεῖον καὶ ἄλλας οἰκίας ὀλίγας. αἴτιον δ' ἔγωγε νομίζω τοῦ τοιούτου, ἡ ἰσχυρότατος ὁ σεισμὸς ἐγένετο, κατὰ τοῦτο ἀποστέλλειν τε τὴν θάλασσαν καὶ ἐξαπίνης πάλιν ἐπισπωμένην βιαιότερον τὴν ἐπὶ κλυσὶν ποιεῖν· ἄνευ δὲ σεισμοῦ οὐκ ἂν μοι δοκεῖ τὸ τοιοῦτο ξυμβῆναι γενέσθαι.

According to Strabo, Demetrius of Callatis tells of natural disasters occurring along the north-west coast of Euboea: "In his account of all the earthquakes that have ever occurred in the whole of Greece, Demetrius of Callatis says that the greater part of the Lichades and of Cenaeum was engulfed, and that the hot springs at Aedepsus and Thermopylae stopped flowing for three days, while those of Aedepsus also gushed out at other sources. At Oreus the seaward wall collapsed, as well as about seven hundred houses".

Δημήτριος δ' ὁ Καλλατιανὸς τοὺς καθ' ὅλην τὴν Ἑλλάδα γενομένους ποτὲ σεισμούς διηγούμενος τῶν τε Λιχάδων νήσων καὶ τοῦ Κηναίου τὰ πολλὰ καταδῦναι φησι, τὰ τε θερμὰ τὰ ἐν Αἰδηψῷ καὶ Θερμοπύλαις ἐπὶ τρεῖς ἡμέρας ἐπισχεθέντα πάλιν ῥυῆναι, τὰ δ' ἐν Αἰδηψῷ καὶ καθ' ἑτέρας ἀναρραγῆναι πηγὰς. Ὁρεοῦ δὲ τὸ πρὸς θαλάττῃ τεῖχος καὶ τῶν οἰκιῶν περὶ ἑπτακοσίας συμπεσεῖν.

We also find from the same source that the earthquake struck on both sides of the Gulf of Malia: "A large part of Echinus and Phalara and Heraclea Trachinea was re-

duced to ruins, but the settlement of Phalara was destroyed right to its foundations. Something similar also occurred at Lamia and Larissa. Scarphe, too, was razed to the ground, and no fewer than seventeen hundred people were buried in the ruins. There were more than half that number of victims at Thronium. A triple sea-wave rose up, one part of which was carried towards Tarphe and Thronium, a second to Thermopylae and a third into the plain as far as Daphnus in Phocis. River sources dried up for several days, and the Sperchius changed its course, making roads navigable. The Boagrius was carried down a different ravine, and many areas of Alope, Cynus and Opus were seriously damaged, while Oeum, the castle above Opus, was completely destroyed. Part of the walls collapsed at Elatea, and during the celebration of the Thesmophoria at Alponus, twenty-five girls ran up into one of the towers at the harbour to get a better view, and when it collapsed they too were thrown into the sea. It is also said that the central part of Atalante near Euboea was split open to the extent that ships could pass through, and some of the plains were flooded as far as twenty stades [c.4 km] inland, and a trireme was lifted out of the docks and deposited over the wall".

Ἐχίνου τε καὶ Φαλάρων καὶ Ἡρακλείας τῆς Τραχίνος, τῶν μὲν πολὺ μέρος πεσεῖν, Φαλάρων δὲ καὶ ἐξ ἐδάφους ἀνατραπῆναι τὸ κτίσμα· παραπλήσια δὲ συμβῆναι καὶ Λαμειῦσι καὶ Λαρισαίοις. καὶ Σκάρφειαν δ' ἐκ θεμελίων ἀναρριφῆναι, καὶ καταδύναι σώματα χιλίων καὶ ἑπτακοσίων οὐκ ἐλάττω. Θρονίους δ' ὑπὲρ ἡμῖσιν τούτων· κῦμά τε ἔξαρθὲν τριχῇ, τὸ μὲν πρὸς Τάρφην ἐνεχθῆναι καὶ Θρόνιον τὸ δὲ πρὸς Θερμοπύλας, ἄλλο δὲ εἰς τὸ πεδῖον ἕως τοῦ Φωκικοῦ Λαφνούντος. πηγὰς τε ποταμῶν ξηρανθῆναι πρὸς ἡμέρας τινάς, τὸν δὲ Σπερχεῖον ἀλλάξαι τὸ ρεῖθρον καὶ ποιῆσαι πλωτὰς τὰς ὁδοὺς· τὸν δὲ Βοάγριον κατ' ἄλλης ἐνεχθῆναι φάραγγος. καὶ Ἀλόπης δὲ καὶ Κύνου καὶ Ὀποῦντος πολλὰ καταβλαβῆναι μέρη, Οἶον δὲ τὸ ὑπερκείμενον φρούριον πᾶν ἀνατραπῆναι, Ἐλατείας δὲ τοῦ τείχους καταρραγῆναι μέρος, περὶ δὲ Ἄλπωνον θεσμοφορίων ὄντων πέντε καὶ εἴκοσι παρθένους. ἀναδραμούσας εἰς πύργον τῶν ἐλλιμενίων κατὰ θεάν, πεσόντος τοῦ πύργου, πεσεῖν καὶ αὐτὰς εἰς τὴν θάλατταν. λέγουσι δὲ καὶ τῆς Ἀταλάντης τῆς πρὸς Εὐβοίᾳ τὰ μέσα, ῥήγματος γενομένου, διάπλουν δέξασθαι, μεταξὺ καὶ τῶν πεδίων ἔνια καὶ μέχρι εἴκοσι σταδίων ἐπικλυσθῆναι, καὶ τριήρη τινὰ ἐκ τῶν νεορίων ἐξαιρεθεῖσαν ὑπερπεσεῖν τοῦ τείχους.

Diodorus also records the earthquake and the geological upheaval it caused: "While the Athenians were busy with these matters, the Spartans took the Peloponnesians with them and pitched camp at the Isthmus, intending to invade Attica again; but when severe earthquakes occurred, they were filled with superstitious fear and returned to their native lands. The shocks were in fact so severe in many parts of Greece that the sea actually swept away and destroyed some coastal towns, while in Locris, a strip of land forming a peninsula was torn apart and the island known as Atalante was formed".

Τῶν δ' Ἀθηναίων περὶ ταῦτ' ἀσχολουμένων Λακεδαιμόνιοι τοὺς Πελοποννησίους παραλαβόντες κατεστρατοπέδευσαν περὶ τὸν ἰσθμὸν, διανοούμενοι πάλιν εἰς Ἀττικὴν εἰσβαλεῖν· σεισμῶν δὲ μεγάλων γινομένων δεισδαιμονήσαντες ἀνέκαμψαν εἰς τὰς πατρίδας. τηλικούτους δὲ τοὺς σεισμοὺς συνέβη γενέσθαι κατὰ πολλὰ μέρη τῆς Ἑλλάδος, ὥστε καὶ πόλεις τινὰς ἐπιθαλαττίους ἐπικλύσασαν τὴν θάλατταν διαφθεῖραι, καὶ κατὰ τὴν Λοκρίδα χερρονήσου καθεστώσης ῥῆξαι μὲν τὸν ἰσθμὸν, ποιῆσαι δὲ νῆσον τὴν ὀνομαζομένην Ἀταλάντην.

The seismological aspects of the occurrence have recently been examined by Antonopoulos (1992), who has tried to establish exactly what happened and assess the degree of destructiveness of the earthquake. In his opinion, the evidence provided by the sources suggests that the earthquake shocks which occurred between 427 and 426 (see entry (012)) were frequent but not particularly intense. On the other hand, the

shocks in the summer of 426 in the stretch of sea between Euboea and the mainland were of considerable magnitude. The social effects of the earthquake have been examined by Autino (1987, pp.416ff.). The large number of victims, the damage and the changes to the coastline had the effect of exacerbating the tense situation already created by the war. Thucydides' detailed account is particularly noteworthy, and it was unusual for him to dwell on the effects of earthquakes (see Panessa 1991, p.317). It may be of interest to note that on 20 and 27 April 1894 (8 and 15 April in the Julian calendar, which was still used in Greece at that time), the same area of Locris was struck by two very severe earthquakes, whose effects on the terrain were very similar to those of the 426 B.C. earthquake (Skuphos 1894): thus in the region of the Gulf of Atalandi a peninsula became an island, just as happened in the same area in 426 B.C. according to Diodorus' account (see especially the photographs in Stiros and Dakoronia 1989, p.428, fig.193, where the islands "created" by the two earthquakes can be seen).

<015> **the winter of 426-425 B.C. •Catania, •Sicily**
 ▷**eruption of Etna**<

sources 1 Thuc. 3.116.1-3; Arist. *Mete.* 2.8.366 a; Oros. *Hist.* 2.18.6
 sources 2 Georg. *Sync.* 489
 literature Gomme (1956); Panessa (1991)
 catalogues Bonito (1691); von Hoff (1840); Mercalli (1883); Guidoboni (1989)

The principal source for this earthquake is Paulus Orosius, who was writing about nine centuries after the event. Nevertheless, a comparison with other Greek authors confirms once again that he is reliable. Orosius records that a very violent earthquake struck Sicily in 426 B.C. and that, in addition, eruptions of Etna caused the destruction of fields and farms: "Later on in that same period, Sicily was struck by a very severe earthquake, and in addition it was devastated by fire and hot ashes which erupted from Mt.Etna, causing much damage to fields and farms".

His deinde temporibus gravissimo motu terrae concussa Sicilia, insuper exaestuanti-bus Aethnae montis ignibus favillisque calidis cum detrimento plurimo agrorum villarumque vastata est.

In his next paragraph, Orosius records a seismic sea-wave which overwhelmed Atalante in Greece in the same year (see entry <014>)). A better dating for the earthquake can be argued from the account of Thucydides, who also records the eruption of Etna which caused damage in the Catania area, even though he does not mention the earthquake: "At the very beginning of this spring, a torrent of fire burst forth from Mt.Etna, as it had done previously, and destroyed part of the lands of the people of Catania who live on the slopes of the mountain, the highest in Sicily [...]. These events occurred during that winter, when the sixth year of the war described by Thucydides was coming to an end".

Ἐρρῦν δὲ περὶ αὐτὸ τὸ ἔαρ τοῦτο ὁ ῥύαξ τοῦ πυρὸς ἐκ τῆς Αἵτνης, ὥσπερ καὶ γῆν τινὰ ἔφθειρε τῶν Καταναίων, οἱ ὑπὸ τῇ Αἵτνῃ τῷ ὄρει οἰκοῦσιν, ὅπερ μέγιστόν ἐστιν ὄρος ἐν τῇ Σικελίᾳ. [...] ταῦτα μὲν κατὰ τὸν χειμῶνα τοῦτον ἐγένετο, καὶ ἕκτον ἔτος τῷ πολέμῳ ἐτελεύτα τῷδε ὃν Θουκυδίδης ξυνέγραψεν.

This phenomenon is recorded περὶ αὐτὸ τὸ ἔαρ τοῦτο, "about the spring of that year [426-425 B.C.]", that is, as Gomme explains (1956, p.431), "just at the turn of winter and spring". Gomme's chronology seems to fix this event at about the beginning of 425, according to the Julian year (Gomme 1956, p.719: thence Panessa 1991); however, as Thucydides' chronology does not seem to suit a fixed year (see Gomme's Appendix on

Thucydides' 'Summers and Winters': 1956, pp.699ff.), we have to take this account in a rather elastic way.

Panessa (1991, p.395) thinks that Aristotle's reference to Sicily in *Mete.* 2.8.366a relates to an earthquake on the "east coast of Sicily" before 360 B.C. (see also entry <025>). It is possible, however, that Aristotle is simply making a general reference to an area well known for earthquakes.

<016> **March 424 B.C. Athens?**

sources Thuc. 4.52.1

literature Boll (1909); Autino (1987); Panessa (1991)

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Guidoboni (1989)

Thucydides records an isolated earthquake tremor which probably struck Athens, though he does not provide a specific location: "At the very beginning of the next good season, there was a partial eclipse of the sun early in the month, and an earthquake tremor occurred in the first ten days of the same month".

Τοῦ ἐπιγιγνομένου θέρους εὐθὺς τοῦ τε ἡλίου ἐκλιπές τι ἐγένετο περὶ νουμενίαν καὶ τοῦ αὐτοῦ μηνὸς ἱσταμένου ἔσεισεν.

The eclipse of the sun is also mentioned by Aristophanes (*Nu.* 584). It occurred, in fact, on 21 March 424 B.C. (Boll 1909, col.2355).

<017> **the late summer of 420 B.C. Athens, Corinth**

sources Thuc. 5.45.4, 5.50.5

literature Autino (1987); Panessa (1991)

catalogues Schmidt (1881); Galanopoulos (1961); Shebalin *et al.* (1974); Guidoboni (1989)

There are two separate passages in Thucydides where he mentions earthquake tremors felt at Athens and Corinth in the summer of 420 B.C., but the little information he provides makes it impossible to judge whether these were separate tremors or a single earthquake, as the comparatively short distance between Athens and Corinth would suggest.

Thucydides records (5.45.4) that while Alcibiades was inveighing against Sparta at an assembly in Athens, and urging the Athenians to declare themselves ready to call on the Argives to make an alliance with them, "the assembly was adjourned before any decision could be reached, because an earthquake occurred".

Σεισμοῦ δὲ γενομένου πρὶν τι ἐπικυρωθῆναι, ἡ ἐκκλησία αὕτη ἀνεβλήθη.

The tremor was probably only a slight one, for the assembly which had been adjourned because of the earthquake was resumed the next day (Thuc. 5.46.1).

At Corinth, too, the earthquake caused an assembly to be abandoned; but in this case it was never reconvened. Thucydides writes (5.50.5): "But after the Olympic games, the Argives and their allies came to Corinth, to ask them to join their league. Spartan envoys also happened to be present. Many proposals were made, but nothing was done; for an earthquake occurred and they all went home. And the summer ended".

Ἐς δὲ Κόρινθον μετὰ τὰ Ὀλύμπια Ἀργεῖοί τε καὶ οἱ ξύμμαχοι ἀφίκοντο δεησόμενοι αὐτῶν παρὰ σφᾶς ἐλθεῖν. καὶ Λακεδαιμονίων πρέσβεις ἔτυχον παρόντες, καὶ πολλῶν λόγων γενομένων τέλος οὐδὲν ἐπράχθη, ἀλλὰ σεισμοῦ γενομένου διελύθησαν ἕκαστοι ἐπ' οἴκου. καὶ τὸ θέρος ἐτελεύτα.

<018> **the spring of 414 B.C. Cleonae**

sources Thuc. 6.95.1
literature Popp (1959); Autino (1987)
catalogues Schmidt (1881); Guidoboni (1989)

Thucydides records that when the Spartans reached Cleonae, they broke off a military expedition against Argolis because of an earthquake, just as had happened at the Isthmus of Corinth in 426 B.C.: "During that same spring, the Spartans got as far as Cleonae on an expedition to Argolis, but when an earthquake occurred, they withdrew".

Τοῦ δ' αὐτοῦ ἡρὸς καὶ ἐπ' Ἀργὸς στρατεύσαντες Λακεδαιμόνιοι μέχρι μὲν Κλεωνῶν ἦλθον, σεισμοῦ δὲ γενομένου ἀπεχώρησαν.

<019> **the winter of 413-412 B.C. Sparta**

sources Thuc. 8.6.5; Xenoph. *hell.* 3.3.2; Plut. *Ages.* 3.9; *Alc.* 23.7-9
literature Hatzfeld (1933); Autino (1987); Panessa (1991)
catalogues Schmidt (1881); Papazachos and Papazachos (1989); Guidoboni (1989)

Thucydides says that in the winter of 413-412, when the Spartans were about to send a naval expedition to support Chios in its rebellion against Athens, an earthquake occurred: "But afterwards, when an earthquake occurred, [the Spartans] sent Chalcideus instead of Melanchridas".

Ἐπειτα σεισμοῦ γενομένου ἀντὶ τοῦ Μελεαγρίδου Χαλκιδέα ἔπεμπον.

The earthquake was interpreted as a bad omen, so command of the fleet was transferred from Melanchridas to Chalcideus, and the expedition, now consisting of a smaller number of ships, was postponed until the next summer.

Xenophon and Plutarch may also be referring to this earthquake when they tell how Alcibiades fled from the bed of his lover, Timaea, wife of king Agis, when frightened by an earthquake. When Timaea gave birth to Leotychidas some time later, the child was assumed to be Alcibiades' son.

In his *Hellenics*, Xenophon puts the following words into the mouth of Agesilaus: "But Poseidon has already shown that you are lying, for he sent an earthquake which caused your real father [Alcibiades] to flee from the nuptial chamber. And time, which they say is never mistaken, is further evidence of this: for you were born in the tenth month after the time when he brought about your conception'. Such was their conversation".

“Ἀλλὰ ὁ Ποσειδὼν ὥς μάλα σευ ψευδομένῳ κατεμήνυσεν ἐκ τοῦ θαλάμου ἐξελάσας σεισμῶ εἰς τὸ φανερόν τὸν σὸν πατέρα. συνεμαρτύρησε δὲ ταῦτ' αὐτῷ καὶ ὁ ἀληθέστατος λεγόμενος χρόνος εἶναι· ἀφ' οὗ γάρ τοι ἔφυσε <σε> καὶ ἐφάνη ἐν τῷ θαλάμῳ, δεκάτῳ μηνὶ ἐγένου”. οἱ μὲν τοιαυτ' ἔλεγον.

Plutarch writes (*Ages.* 3.9): "Agesilaus declared that Poseidon had also shown Leotychidas to be a bastard, for he had caused Agis to flee from the bedchamber by means of an earthquake, and Leotychidas was born more than ten months later".

Ὁ δ' Ἀγησίλαος ἔφη καὶ τὸν Ποσειδῶνα καταμαρτυρεῖν τοῦ Λεωτυχίδου τὴν νοθείαν, ἐκβαλόντα σεισμῷ τοῦ θαλάμου τὸν Ἀγιν· ἀπ' ἐκείνου δὲ πλεον ἢ δέκα μηνῶν διελθόντων γενέσθαι τὸν Λεωτυχίδην.

As a comparison with Xenophon shows, Plutarch has clearly made a slip here, for it was not Agis who was frightened away by the earthquake, but the adulterous

Alcibiades (see Hatzfeld 1933). Indeed, Plutarch himself says, in *Alc.* 23.7-9: "The fact is that [Alcibiades] seduced Timaiia, the wife of king Agis, who was leading a military expedition abroad at the time, and she did not hide the fact when she became pregnant. She gave birth to a son who was called Leotychidas away from home, but such was the extent of her amorous passion that the name whispered at home in front her friends and serving women was Alcibiades. But the latter sarcastically said that what he had done was not to spite the king nor out of amorous passion, but to ensure that his descendants would reign in Sparta. Many people reported these matters to Agis; but it was the time factor which convinced him above all, for when an earthquake had occurred, he had leapt from his wife's side in fear, and had not approached her again for ten months. Since Leotychidas was born after this period, he could not be the father".

Τιμαίαν γὰρ τὴν Ἀγίδος γυναῖκα τοῦ βασιλέως στρατευομένου καὶ ἀποδημοῦντος οὕτω διέφθειρεν, ὥστε καὶ κύειν ἐξ Ἀλκιβιάδου καὶ μὴ ἀρνεῖσθαι, καὶ τεκούσης παιδίον ἄρρεν ἔξω μὲν Λεωτυχίδην καλεῖσθαι, τὸ δ' ἐντὸς αὐτοῦ ψιθυριζόμενον ὄνομα πρὸς τὰς φίλας καὶ τὰς ὀπαδοὺς ὑπὸ τῆς μητρὸς Ἀλκιβιάδην εἶναι τοιοῦτος ἔρος κατεῖχε τὴν ἄνθρωπον. ὁ δ' ἐντροφῶν ἔλεγεν οὐχ ὕβρει τοῦτο πράσσειν οὐδὲ κρατούμενος ὑφ' ἡδονῆς, ἀλλ' ὅπως Λακεδαιμονίων βασιλεύσωσιν οἱ ἐξ αὐτοῦ γεγονότες. οὕτω δὲ πραττόμενα ταῦτα πολλοὶ κατηγοροῦν πρὸς Ἀγιν. ἐπίστευσε δὲ τῷ χρόνῳ μάλιστα, ὅτι σεισμοῦ γενομένου φοβηθεὶς ἐξέδραμε τοῦ θαλάμου παρὰ τῆς γυναικός, εἴκα μηνῶν οὐκέτι συνῆλθεν αὐτῇ, μεθ' οὗς γενόμενον τὸν Λεωτυχίδην ἀπέφησεν ἐξ αὐτοῦ μὴ γεγονέναι.

The earthquake seems to have been remembered principally because of its connection with historical events and stories.

<020> **the winter of 412-411 B.C. • the island of Cos**

- sources Thuc. 8.41.2
- literature Autino (1987); Panessa (1991)
- catalogues Schmidt (1881); Sieberg (1932 a); Galanopoulos (1961); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

In the winter of 412-411, according to Thucydides, the Spartan commander Astyochus sacked the island of Cos (an ally of Athens), taking advantage of the fact that it had been struck by a violent earthquake, which had forced the inhabitants to flee to the mountains: "On his way along the coast he [Astyochus] landed at Cos Meropis and sacked the town, for it had no walls and was now in ruins as a result of the most violent earthquake within living memory. The inhabitants had fled into the mountains, and he made raids into the country, seizing booty but letting the free population go".

Καὶ ἐς Κῶν τὴν Μεροπίδα ἐν τῷ παράπλῳ ἀποβάς τὴν τε πόλιν ἀτείχιστον οὖσαν καὶ ὑπὸ σεισμοῦ, ὃς αὐτοῖς ἔτυχε μέγιστός γε δὴ ὦν μεμνήμεθα γενόμενος, ξυμπεπτωκυῖαν ἐκπορθεῖ, τῶν ἀνθρώπων ἐς τὰ ὄρη πεφευγόντων, καὶ τὴν χώραν καταδρομαῖς λείαν ἐποιεῖτο, πλὴν τῶν ἐλευθέρων· τούτους δὲ ἀφίει.

<021> **403-401 or 400 B.C. Elis**

- sources 1 Xenoph. *hell.* 3.2.23-4
- sources 2 Paus. 3.8.4
- literature Hatzfeld (1933); Popp (1959); Autino (1987); Panessa (1991)
- catalogues Papazachos and Papazachos (1989); Guidoboni (1989)

In the *Hellenics*, Xenophon tells how Agis (king of Sparta) withdrew his army from Elis after an earthquake, interpreting it as a warning from the gods: "Agis crossed Achaia at the head of the army in order to invade Elis at the river Larisus; but shortly after the army had entered enemy country and was sacking the countryside, an earthquake occurred. Agis took this to be a divine warning, so he left the area and dismissed the army".

Ἄγων δὲ τὸ στράτευμα Ἄγεις ἐνέβαλε διὰ τῆς Ἀχαιῆας εἰς τὴν Ἡλείαν κατὰ Λάρισον. ἄρτι δὲ τοῦ στρατεύματος ὄντος ἐν τῇ πολεμίᾳ καὶ κοπτομένης τῆς χώρας, σεισμὸς ἐπιγίγνεται· ὁ δ' Ἄγεις θεῖον ἡγησάμενος ἐξελθὼν πάλιν ἐκ τῆς χώρας διαφῆκε τὸ στράτευμα.

Pausanias says much the same thing: "The army had advanced as far as Olympia and the Alpheus, when an earthquake caused it to retreat".

Τότε μὲν δὴ τοῦ θεοῦ σείσαντος ὀπίσω τὸ στράτευμα ἀπεχώρησεν ἄχρι Ὀλυμπίας καὶ τοῦ Ἀλφειοῦ προελθόντες.

It is significant that when Pausanias notes the fact that the earthquake occurred at the moment when Elis was being invaded by the Spartans under the command of king Agis, he uses an expression with a religious connotation: θεοῦ σείσαντος (since the god shook the earth). From this point of view, an earthquake at the moment of invasion was to be interpreted as a sign of divine disapproval. And the causes of the conflict are presented in such a way as to put Sparta in an unfavourable light, for its behaviour towards the Elians is such as to justify this manifestation of divine wrath. Here we have a favourite narrative technique of Pausanias: to provide a theological explanation for natural phenomena which were either disastrous or such as to instil fear. In reality, however, what Agis did was to take advantage of the earthquake in order to call off an enterprise which he did not find politically convincing. So he had no difficulty in reacting exactly like Agesipolis thirteen years later (Panessa 1991, pp.353-4). There are doubts about the date of this earthquake, though it is traditionally supposed to have occurred in 400 B.C., that being an Olympic year. Hatzfeld (1933), rejects that idea, on the grounds that if it had been true, it would have attracted the attention of historians, and he suggests instead the period between 403 and 401 B.C.

<022> 388 B.C. ● Argos, Nemea, Argolis ▷ landslide? ◁

sources Xenoph. *hell.* 4.7.4-5; Paus. 3.5.8-9

inscriptions Vollgraff (1956, 110) = SEG 17.146

literature Popp (1959); Autino (1987); Panessa (1991)

catalogues Bonito (1691); Schmidt (1881); Papazachos and Papazachos (1989); Guidoboni (1989)

In the *Hellenics*, Xenophon tells us that while the Spartan army under Agesipolis was at Nemea, on its way from Phlius to Argos, there was an earthquake. Unlike Agis on a similar occasion, however, Agesipolis did not withdraw his army; on the contrary, he pursued his military campaign: "On his first evening in the land of the Argives, [Agesipolis] was at dinner when, after the libations which followed the dinner, the god sent an earthquake. Thereupon the Spartans, beginning with those who belonged to headquarters, chanted a paeon to Poseidon; but the rest of the soldiers were expecting to retreat, because Agis had once withdrawn his troops from Elis after an earthquake. Agesipolis, however, said that if the earthquake had happened just before he began the invasion, he would have taken it that the god wanted to put a stop to the expedition; but since the invasion had already begun when it occurred, he assumed it was a sign of encouragement; and so the next day, after making a sacrifice to Poseidon, he resumed his advance into the country".

Δειπνοποιουμένου δ' αὐτοῦ ἐν τῇ Ἀργείᾳ τῇ πρώτῃ ἑσπέρᾳ, καὶ σπονδῶν τῶν μετὰ δεῖπνον ἤδη γιγνομένων, ἔσεισεν ὁ θεός. καὶ οἱ μὲν Λακεδαιμόνιοι ἀρξάμενων τῶν ἀπὸ δαμοσίας πάντες ὕμνησαν τὸν περὶ τὸν Ποσειδῶ παιᾶνα· οἱ δ' ἄλλοι στρατιῶται ὦντο ἀπιέναι, ὅτι καὶ Ἄγις σεισμοῦ ποτε γενομένου ἀπήγαγεν ἐξ Ἥλιδος. ὁ δὲ Ἀγησίπολις εἰπὼν ὅτι εἰ μὲν μέλλοντος αὐτοῦ ἐμβάλλειν σείσειε, κωλύειν ἂν αὐτὸν ἡγεῖτο· ἐπεὶ δὲ ἐμβεβληκός, ἐπικελεύειν νομίζοι· καὶ οὕτω τῇ ὑστεραίᾳ θυσάμενος τῷ Ποσειδῶνι ἡγεῖτο οὐ πόρρω εἰς τὴν χώραν.

Pausanias adds that there were further tremors even when Agesipolis had already begun the siege of Argos: "Then the god shook the earth, but even so Agesipolis was not going to withdraw his forces, though of all the peoples in Greece, the Spartans, like the Athenians, were most terrified of divine warnings in nature. Even when Agesipolis was already encamped under the walls of Argos, the god continued to shake the earth, and soldiers in his army were struck down by thunderbolts, and some were driven mad by the thunder and lightning. So, still unwillingly, he marched his army out of Argolis, and then mounted an expedition against Olynthus".

Ἔσεισέ τε δὴ ὁ θεός, καὶ ὁ Ἀγησίπολις οὐδ' οὕτω τὴν δύναμιν ἀπάξειν ἔμελλε, καίτοι Λακεδαιμονίοις μάλιστα Ἑλλήνων – ὡσαύτως δὲ καὶ Ἀθηναίοις – δεῖμα αἱ διοσημεῖαι παρείχοντο. καὶ ὁ μὲν ὑπὸ τὸ τεῖχος κατεστρατοπεδεύετο ἤδη τὸ Ἀργείων καὶ οὐ παρὶε σείων ὁ θεὸς καὶ τινες καὶ ἀπώλοντο τῶν στρατιωτῶν κεραυνωθέντες, τοὺς δὲ καὶ ἐκφρονas ἐποίησαν αἱ βρονταί. οὕτω μὲν δὴ ἐκ τῆς Ἀργολίδος ἀνέξευξεν ἄκων, ἐπὶ δὲ Ὀλυνθίους ἐποιεῖτο αὐθις στρατεῖαν.

There is a 4th century B.C. inscription (Vollgraff 1956, 110 = SEG 17.146), found at Argos, which tells of restoration work carried out on the temple of Apollo. It may be related to this earthquake: "God. When Aristeus Sphyredes and Philocrates Naupliades were *promanteis*, Aeschylus Arachnades and Tryges Aetonides, secretaries, consecrated [this stele] to Apollo. In accordance with a divine oracle, they have had built and put in place the *omphalos* of the Earth, with balustrade and railings; they have also moved the altar further to the east, and have also had made a stone fountain with a cavity for collecting the water, as well as a locked container for offerings, inside the oracular sanctuary. And they have restored the steps which lead to the sanctuary and to the upper terrace. They have had restored to their places the [---] and the statues, and have had the upper terrace levelled. They have had a stone surrounding wall built at [---] and have reinforced the temple door. They have offered plates and a silver carafe, have bought a container for offerings, have raised the statue of Apollo Smintheus at the foot of the steps, have levelled the ground which had been damaged in an earthquake, and had planted laurel bushes and trees [---]".

Θεός. προμάντιες ἀνέθεν / Ἀπόλλωνι Ἀρισ[τ]εὺς Σφυρή[δ]ας, Φιλοκράτης Ναυπλιά[δ]ας, γροφέ[ε]ς Αἰσχύλος Ἀραχνά[δ]ας, Τρυγῆς Αἰθωνίδας καὶ κα/τεσκεύασσαν καὶ [ή]σσαντο [θήας] / ἐκ μαντήας Γᾶς ὀμφαλὸν καὶ τί[α]ν/ν περιστ[α]ιν καὶ τὸ φάργμα, καὶ τὸν / βωμὸν προ[ά]γαγον ποτ' ἀ[φ]ῶ, καὶ πέ/τρινον ῥόον καὶ τὰν ἀ[ρ]ύστ[ι]ραν / ὑπὲρ αὐτοῦ καὶ θαυρὸν ἐν τῷ μαν/τήῳ κατεσκεύασσαν τοῖς πελα/νοῖς κλακτόν. καὶ τὰν ὁδὸν ἡργασ/σαντο ἅπανσαν καὶ ὀφρύαν πεδ' ἰα/ρὸν καὶ τὰν ἐπιπολάν, καὶ τὸνς μ[έ]λ[ο]ν[ο]νς ἐνς τάξιν πεδάγαγον καὶ τῶν/ς κολοσσόνς, καὶ τὰν ἐπιπολάν, ὠ[μ]ά[λ]ιξαν, καὶ τοῖχον [π]έτρινον π[α]ρ τῶν/ --- λ --- ἔθεν, καὶ τὰν[ς] θ[ύ]ρα[ν]ς τοῦ ναοῦ / ὠκύρωαν, [καί---] λο[π]ίδας καὶ ἐπιχύ/ταν ἀργυρέα ἔθεν, καὶ θαυρὸν ἐνσε/[π]ρί[α]ντο, καὶ τὸν Σ[μ]ι[θ]αῖον ὀφρύα ὑπέ/[σ]τααν, καὶ τὸ [χωρί]ον ὠ[μ]ά[λ]ιξαν ἐννό[ι] / [διαφθαρέν καὶ δάφναν]ς καὶ δένδ[ρ]η/ ---[ἐν]έφυσαν / --- αμ.

The restoration work recorded in the inscription was preceded by consultation of the oracle, which gave an opinion concerning the reorganisation of parts of the sanctuary, including the fundamentally important matter of a water supply. The text of the

inscription never uses the word *seismós*, which, unlike those used to indicate famine has no synonyms in Greek. What happens instead is that the earthquake is conveyed by means of an archaic and prevalently poetic term, *énosis*, the equivalent of *kínēsis* (movement), which would be readily understood because of its association with *ennosí gaios* and *enosíchthon* ("earth shaker"), which had been well known as epithets of Poseidon since Homeric times (Panessa 1991, pp.356-8).

The inscription refers to the fact that the restorers had levelled the ground, which suggests that the damage to the temple may have been caused by a landslide rather than an earthquake.

⟨023⟩ **shortly before 373 B.C. the island of Delos**

sources Callist. *FGrHist* 124 F 20
 literature Autino (1987); Panessa (1991)
 catalogues Sieberg (1932 a); Guidoboni (1989)

There is a passage in the *Naturales Quaestiones* (6.26.2) where Seneca records a statement by Callisthenes (*FGrHist* 124 F 20) about an earthquake on the Aegean island of Delos. The occurrence was considered to foreshadow the disaster which subsequently struck Achaia (see entry ⟨024⟩): "Callisthenes says that this happened at another time, too. 'Among the many prodigies', he says, 'by which the destruction of the two cities, Helice and Bura, was foretold, especially notable were both the immense columns of fire and the Delos earthquake'. He wishes Delos to be understood as stable because it is on the coast and has hollow cliffs and porous rocks to provide an outlet for the air caught in them. That is why islands have firm ground and why the closer cities lie to the sea, the safer they are".

Callisthenes et alio tempore ait hoc accidisse: "Inter multa" – inquit – "prodigia, quibus denuntiata est duarum urbium Helices et Buris eversio, fuere maxime notabilia columna ignis immensi et Delos agitata". Quam ideo stabilem videri vult, quia mari inposita sit habeatque concavas rupes et saxa pervia, quae dent deprehenso aeri reditum: ob hoc et insulas esse certioris soli urbesque eo tutiores, quo propius ad mare accesserint.

This piece of information causes one to ponder on the question of the inviolability of Delos, which the sources claim included exemption from earthquakes. See entries ⟨004⟩ and ⟨011⟩.

⟨024⟩ **a winter night in 373 B.C. ●Bura, ●Helice ▷seismic sea-wave◁**

sources 1 Arist. *Mete.* 1.6.343 b, 2.8.368 a-b; Ephor. *FGrHist* 70 F 212; Callist. *FGrHist* 124 F 19; Heracleid. Pont. F 46 a Wehrli; Eratosth. *apud* Strabo 8.7.2.; Pol. 2.41.7; Strabo 8.7.5; Diod. 15.48.1-4; Paus. 7.24.6, 7.24.12, 7.25.8-9; Ael. NA 11.19
 sources 2 Ov. *met.* 15.293-5; Bian. *apud Anth. Pal.* 9.423; Philo *De aet. mundi* 26.140; Sen. *NQ* 6.25.4; Plin. *n.h.* 2.206; Amm. 17.7.13; Oros. *Hist.* 3.3.1; *Chron. Pasch.* 169; Georg. Sync. 310.16; Cedren. 255
 literature Homolle (1896); Meyer (1957); Marinatos (1960); Schwartz and Tziavos (1979); Baladié (1980); Bousquet and Péchoux (1981); Autino (1987); Helly (1989); Prandi (1989); Panessa (1991)
 catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Heck (1947); Galanopoulos (1960); Galanopoulos (1961); Ambraseys (1962 b); Shebalin *et al.* (1974); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

In 373 B.C., a violent earthquake, accompanied by a seismic sea-wave, destroyed Helice and Bura, two cities situated on the coast of Achaia in the Gulf of Corinth. The event

was much commented on by contemporary and later sources, because of the extent of the destruction caused at both cities; and it caused scholars of the time to ponder at length on the accompanying climatic and astronomical conditions. One climatic factor which ancient texts, in conformity with Aristotle's seismogenetic theories, assume to be a direct cause of earthquakes, was the wind. And then there was the nature of the coastline of Achaia. Like that of the Hellespont, Sicily and Euboea, it had hollows which, combined with the effect of wind and sea, were considered to be an extra causal factor. Because of their "sponge-like" geological form, these regions were considered by the ancients to be particularly subject to earthquakes, which were also thought to be made more likely by drought and heavy rain.

In this particular case — Aristotle considered it typical — there was apparently an initial destructive earthquake followed by an equally devastating seismic sea-wave, both caused by the clash of contrary winds: one blowing across the sea from the south, and the other across the land from the north. This was followed by a period of calm, during which the wind was "channelled" into the earth, thus giving rise to the violent earthquake and seismic sea-wave. This scientific analysis by Aristotle was the most widely accepted explanation in ancient times, and it has no room for any supernatural element, unlike the accounts of Diodorus, Pausanias and Aelian, though their accounts of the disaster contain many important descriptive elements.

Diodorus writes: "When Asteius was archon at Athens [373/372 B.C.], the Romans elected six military tribunes with consular powers: Marcus Furius, Lucius Furius, Aulus Postumius, Lucius Lucretius, Marcus Fabius and Lucius Postumius. During their term of office, great earthquakes occurred in the Peloponnese, accompanied by tidal waves which engulfed the open country and cities in a manner past belief; for never in earlier periods had such disasters befallen Greek cities, nor had entire cities along with their inhabitants disappeared as a result of some divine force wreaking destruction and ruin upon mankind. The extent of the destruction was increased by the time of its occurrence; for the earthquake did not come in the daytime, when it would have been possible for the victims to help themselves, but at night, so that when houses crashed and crumbled under the force of the shock, the population, owing to the darkness and to the surprise and bewilderment occasioned by the event, had no power to struggle for life. The majority were caught in the collapsing houses and killed, but as day returned some survivors dashed from the ruins and, when they thought they had escaped the danger, met with a greater and still more incredible disaster. For the sea rose to a vast height, and a wave towering even higher washed away and drowned all the inhabitants and their native lands as well. Two cities in Achaia bore the brunt of this disaster, namely Helice and Bura, the former of which, as it happened, held first place among the cities of Achaia before the earthquake. These disasters have been the subject of much discussion. Natural scientists try to attribute responsibility in such cases not to divine providence, but to certain natural circumstances determined by necessary causes; whereas those who are disposed to venerate the divine power find certain plausible reasons for the occurrence, alleging that the disaster was occasioned by the anger of the gods at those who had committed sacrilege. This question I too shall endeavour to deal with in detail in a special chapter of my history".

Ἐπ' ἀρχοντος δ' Ἀθηνησιν Ἀστείου Ῥωμαῖοι κατέστησαν ἀντὶ τῶν ὑπάτων χιλιάρχους ἕξ, Μάρκον Φούριον καὶ Λεύκιον Φούριον, ἔτι δὲ Αὐλὸν Ποστόμιον καὶ Λεύκιον Λοκρήτιον καὶ Μάρκον Φάβιον καὶ Λεύκιον Ποστόμιον. ἐπὶ δὲ τούτων κατὰ τὴν Πελοπόννησον ἐγένοντο σεισμοὶ μεγάλοι καὶ κατακλυσμοὶ χώρας καὶ πόλεων ἅπιστα· οὐδέποτε γὰρ ἐν τοῖς ἐπάνω χρόνοις ἐγένοντο πάθη τοιαῦτα περὶ πόλεις Ἑλληνίδας, οὔτε τῶν πόλεων αὐτάνδρων ἀφανισμός, θείας τινὸς ἐνεργείας τὴν ἀπώλειαν καὶ φθορὰν τῶν ἀνθρώπων μηχανησαμένης. ἐπέτεινε δὲ τὸ μέγεθος τῆς συμφορᾶς ὁ καιρὸς· οὐ γὰρ ἡμέρας συνέβη γενέσθαι τὸν σεισμόν, ἐν ᾗ δυνατόν ἦν

τοὺς κινδυνεύοντας βοηθεῖν ἑαυτοῖς, ἀλλὰ νυκτὸς τοῦ πάθους συμβάντος αἱ μὲν οἰκίαι διὰ τὸ μέγεθος τοῦ σεισμοῦ καταρριπτούμεναι συνεχέοντο, οἱ δὲ ἄνθρωποι διὰ τε τὸ σκότος καὶ τὸ τῆς περιστάσεως ἀπροσδόκητον καὶ παράδοξον ἀδυνάτως εἶχον ἀντιλαμβάνεσθαι τῆς σωτηρίας. οἱ μὲν οὖν πλείους ἐναποληφθέντες τοῖς πτώμασι τῶν οἰκιῶν ἠφανίσθησαν· ἐπιλαβούσης δ' ἡμέρας τινὲς ἐξεπήδων ἐκ τῶν οἰκιῶν, καὶ δόξαντες ἐκπεφυγέναι τὸν κίνδυνον μείζονι καὶ παραδοξοτέρᾳ συμφορᾷ περιέπεσον· τῆς γὰρ θαλάσσης μετεωρισθείσης ἐπὶ πολὺ καὶ κύματος ὑψηλοῦ ἐξαιρομένου κατεκλύσθησαν ἅπαντες σὺν ταῖς πατρίσιν ἀφανισθέντες. ἐγένετο δὲ τοῦτο τὸ πάθος τῆς Ἀχαΐας περὶ δύο πόλεις, Ἑλίκην τε καὶ Βοῦραν, ὧν τὴν Ἑλίκην [τε] συνέβαινε μέγιστον τῶν κατὰ τὴν Ἀχαϊαν πόλεων ἔχειν ἀξίωμα πρὸ τοῦ σεισμοῦ. περὶ δὲ τῶν συμπτωμάτων μεγάλης οὔσης ζητήσεως, οἱ μὲν φυσικοὶ πειρῶνται τὰς αἰτίας τῶν τοιούτων παθῶν οὐκ εἰς τὸ θεῖον ἀναφέρειν, ἀλλ' εἰς φυσικὰς τινὰς καὶ κατηναγκασμένας περιστάσεις, οἱ δ' εὐσεβῶς διακείμενοι πρὸς τὸ θεῖον πιθανὰς τινὰς αἰτίας ἀποδιδούσι τοῦ συμβάντος, ὥς διὰ θεῶν μῆνιν γεγεννημένης τῆς συμφορᾶς τοῖς εἰς τὸ θεῖον ἀσεβήσασιν· περὶ ὧν καὶ ἡμεῖς ἀκριβῶς ἀναγράψαι πειρασόμεθα τῇ κατὰ μέρος ἱστορίᾳ.

This earthquake is described by Pausanias in three different places in his narrative. At 7.24.6 he writes: "Even Homer has written about Helice and Heliconian Poseidon. But later on, when the Achaeans of this area pulled ritual suppliants out of the sanctuary and murdered them, the vengeance of Poseidon was immediate. An earthquake struck the country, and destroyed every single building, until the very foundations of the city were lost for all time".

Ἔστι δὲ καὶ Ὀμήρῳ πεποιημένα ἐς Ἑλίκην καὶ τὸν Ἑλικώνιον Ποσειδῶνα. χρόνῳ δὲ ὕστερον Ἀχαιοῖς τοῖς ἐνταῦθα, ἱκέτας ἄνδρας ἀποστήσασιν ἐκ τοῦ ἱεροῦ καὶ ἀποκτείνουσιν, οὐκ ἐμέλλησε τὸ μήνιμα ἐκ τοῦ Ποσειδῶνος, ἀλλὰ σεισμός ἐς τὴν χώραν σφίσιν αὐτίκα κατασκήψας τῶν τε οἰκοδομημάτων τὴν κατασκευὴν καὶ ὁμοῦ τῇ κατασκευῇ καὶ αὐτὸ τῆς πόλεως τὸ ἔδαφος ἀφανὲς ἐς τοὺς ἔπειτα ἐποίησε.

At 7.24.12 we read: "They say now that an earthquake of this kind uprooted Helice from its foundations, and that the same winter brought a further punishment: the sea flooded in far over the land and overwhelmed the city and its surroundings, and the swell of the sea so covered the sacred grove of Poseidon that nothing could be seen but the tops of the trees. A sudden tremor was sent by the god, and with the earthquake the sea ran back, dragging down Helice into the receding waters with every living person".

Τότε δὲ ιδέαν μὲν ταύτην ἐπὶ τῇ Ἑλίκῃ τοῦ σεισμοῦ τὴν [ἐς] τὸ ἔδαφος ἀνακινουῦσαν, σὺν δὲ αὐτῇ καὶ ἄλλο πῆμα τοιόνδε οἱ ἐπιγενέσθαι φασὶν ὥρα χειμῶνος. ἐπῆλθε γὰρ σφίσιν ἐπὶ πολὺ τῆς χώρας ἡ θάλασσα καὶ τὴν Ἑλίκην περιέλαβεν ἐν κύκλῳ πᾶσαν· καὶ δὲ καὶ τὸ ἄλσος τοῦ Ποσειδῶνος ἐπὶ τοσοῦτον ἐπέσχην ὃ κλύδων ὥς τὰ ἄκρα τῶν δένδρων σύνοπτα εἶναι μόνον. σείσαντος δὲ ἐξαίφνης τοῦ θεοῦ καὶ ὁμοῦ τῷ σεισμῷ τῆς θαλάσσης ἀναδραμούσης, καθείλκυσεν αὐτανδρον τὸ κύμα τὴν Ἑλίκην.

At 7.25.8-9, Pausanias describes the disaster which struck Bura: "When you come back to Cerynea and to the highway, and travel not far along it, you can turn off once more to get to Bura, which lies on a mountain to the right of the coast. They say it was named after a Bura who was the daughter of Ion and Helice. When the god obliterated Helice, there was a violent earthquake at Bura as well, so that not even the ancient statues survived in their sanctuaries, and men who happened to be away at the time in the army or for some other reason, were the only people of Bura left alive, and it was they who refounded the city".

Ἐκ Κερυνείας δὲ ἐπανελθόντι ἐς τὴν λεωφόρον καὶ ὁδεύσαντι οὐκ ἐπὶ πολὺ δεύτερα ἔστιν ἐς Βοῦραν ἀποτραπέσθαι· θαλάσσης [δὲ] ἐς δεξιάν, καὶ ἡ Βοῦρα ἐν ὄρει κείται.

τεθῆναι δὲ φασὶ τῇ πόλει τὸ ὄνομα ἀπὸ γυναικὸς Βούρας, θυγατέρα δ' αὐτὴν Ἰωνος τοῦ Ξούθου καὶ Ἑλίκης εἶναι. ὅτε δὲ Ἑλίκην ἐποίησεν ἄδηλον ἐξ ἀνθρώπων ὁ θεός, τότε καὶ τὴν Βοῦραν σεισμὸς ἐπέλαβεν ἰσχυρὸς, ὥς μὴδὲ τὰ ἀγάλματα ἐν τοῖς ἱεροῖς ὑπολειφθεῖναι τὰ ἀρχαῖα. ὅποσοι δὲ τενικαῦτα ἀποδημοῦντες ἢ στρατείας ἕνεκα ἔτυχον ἢ κατὰ πρόφασιν, μόνοι τε οὗτοι Βουρέων ἐλείφθησαν καὶ αὐτοὶ τῆς Βούρας ἐγένοντο οἰκισταί.

Because of its destructive force, and because of the vicinity of the great cultural centres of the Greek world, the earthquake at Helice proved to be an important event in the evolution of Greek scientific thought, since it encouraged a consideration of those large-scale natural phenomena which transform man's surroundings. We can gain some idea of the extent to which the interest of the ancients was aroused, from the full account provided by Strabo of an event which he also mentions in the *Prolegomena*. Strabo refers to the evidence provided by Heraclides of Pontus (F 46 a): "And Heraclides says that the submersion took place at night in his time and, although the city was twelve stades from the sea, this whole district together with the city was hidden from sight; and two thousand men who had been sent by the Achaeans were unable to recover the dead bodies; and they divided the territory of Helice amongst its neighbours. The submersion was the result of the anger of Poseidon, for the Ionians who had been driven out of Helice sent me to ask the inhabitants particularly for the statue of Poseidon, or, if not that, for the model of the temple; and when the inhabitants refused to give either, the Ionians reported this to the general council of the Achaeans; but although the assembly voted in favour, even then the inhabitants of Helice refused to obey; and the submersion resulted the following winter; but the Achaeans later gave the model of the temple to the Ionians".

Ἡρακλείδης δὲ φησὶ κατ' αὐτὸν γενέσθαι τὸ πάθος νύκτωρ, δώδεκα σταδίους διεχούσης τῆς πόλεως ἀπὸ θαλάττης καὶ τούτου τοῦ χωρίου παντὸς σὺν τῇ πόλει καλυφθέντος, δισχιλίους δὲ παρὰ τῶν Ἀχαιῶν πεμφθέντας ἀνελέσθαι μὲν τοὺς νεκροὺς μὴ δύνασθαι, τοῖς δ' ὁμόροις νεῖμαι τὴν χώραν. συμβῆναι δὲ τὸ πάθος κατὰ μῆνιν Ποσειδῶνος, τοὺς γὰρ ἐκ τῆς Ἑλίκης ἐκπεσόντας Ἰωνας αἰτεῖν πέμψαντας παρὰ τῶν Ἑλικέων μάλιστα μὲν τὸ βρέτας τοῦ Ποσειδῶνος, εἰ δὲ μή, τοῦ γε ἱεροῦ τὴν ἀφίδρυσιν. οὐ δόντων δὲ, πέμψαι πρὸς τὸ κοινὸν τῶν Ἀχαιῶν, τῶν δὲ ψηφισαμένων, οὐδ' ὥς ὑπακοῦσαι. τῷ δ' ἐξῆς χειμῶνι συμβῆναι τὸ πάθος, τοὺς δ' Ἀχαιοὺς ὕστερον δοῦναι τὴν ἀφίδρυσιν τοῖς Ἰωσιν.

In the same passage (8.7.2), Strabo records a kind of "archaeological" survey carried out by Eratosthenes in the disaster area: "And Eratosthenes says that he himself saw the place, and that the ferrymen say that there was a bronze Poseidon in the strait, standing erect, holding a hippocampus in his hand, which was dangerous for those who fished with nets".

Ἐρατοσθένης δὲ καὶ αὐτὸς ἰδεῖν φησὶ τὸν τόπον, καὶ τοὺς πορθμέας λέγειν, ὥς ἐν τῷ πόρῳ ὀρθὸς ἐστίκει Ποσειδῶν χάλκεος, ἔχων ἱππόκαμπον ἐν τῇ χειρὶ, κίνδυνον φέροντα τοῖς δικτυεῦσιν.

As regards Bura, Strabo (8.7.5) simply records that it: "was swallowed up in an earthquake".

ἢν ὑπὸ σεισμοῦ κοταποθῆναι συνέβη.

In the work of the 2nd-3rd century A.D. writer Aelian, we find some interesting observations (which do not appear in any other source) concerning the strange behaviour of animals at Helice, for they left the city *en masse* five days before the earthquake, to the puzzled amazement of the local people: "When a house is about to collapse, the mice and martens in it become aware of what is going to happen and flee. This is

exactly what they say happened at Helice [...] in fact, five days before Helice disappeared, all the mice and martens and snakes and centipedes and beetles and every other similar creature in the town left in a body by the road that leads to Cerynea. When the people of Helice saw this happening, they were amazed, but could not guess the reason for it. But after these creatures had departed, an earthquake occurred during the night. The town collapsed, and an immense wave poured over it, causing it to disappear; and ten Spartan ships which happened to be at anchor close by were destroyed along with the city”.

Μελλούσης δὲ οἰκίας καταφέρεσθαι αἰσθητικῶς ἔχουσιν οἱ τε ἐν αὐτῇ μύες καὶ μέντοι καὶ αἱ γαλαῖ, καὶ φθάνουσι τὴν καταφορὰν καὶ ἐξοικίζονται. τοῦτό τοι φασὶ καὶ ἐν Ἑλικῇ γενέσθαι. [...] πρὸ πέντε γὰρ ἡμερῶν τοῦ ἀφανισθῆναι τὴν Ἑλικήν, ὅσοι μύες ἐν αὐτῇ ἦσαν καὶ γαλαῖ καὶ ὄφεις καὶ σκολόπενδραι καὶ σφονδύλαι καὶ τὰ λοιπὰ ὅσα ἦν τοιαῦτα, ἀθρόα ὑπεξῆει τῇ ὁδῷ τῇ ἐς Κερύνειαν ἐκφερούση. οἱ δὲ Ἑλικήσιοι ὁρῶντες τὰ πραττόμενα ἐθαύμαζον μὲν, οὐκ εἶχον δὲ τὴν αἰτίαν συμβαλεῖν. ἐπεὶ δὲ ἀνεχώρησε τὰ προειρημέτα ζῶα, νύκτωρ γίνεται σεισμός, καὶ συνιζάνει ἡ πόλις, καὶ ἐπικλύσαντος πολλοῦ κύματος ἡ Ἑλικὴ ἠφανίσθη, καὶ κατὰ τύχην Λακεδαιμονίων ὑφομοῦσαι δέκα νῆες συναπώλοντο τῇ προειρημένῃ.

The ancients were most insistent that the ruins of Helice could be seen under water, and even included those of Bura — which is most unlikely. Since these claims have come down to us, underwater exploration was carried out in September 1951 over an area of about 19 square kilometres in the two bays of Helice and Bura. They were apparently successful. Later on, Marinatos (1960) argued on the basis of the evidence provided by Eratosthenes that Helice could be found at a depth of about ten metres, for he calculated that this was the maximum depth at which underwater objects could be made out.

Baladié (1980, pp.145-52) recently returned to the problem and rejected the identification of the underwater site, partly because the deltas of three mountain streams which produce large alluvial deposits are close together in that area. Not only have they significantly altered the coastline, but they also produce huge quantities of mud which can easily interfere with visibility, as investigations have shown. It is therefore quite possible that the city of Helice lies buried under the soil deposits brought down by the three mountain streams.

Identifying Bura is a less difficult problem. Meyer (1957, pp.81-2) thought it was at Kastro in a mountain area above Diakopto, near the village of Kernitsa. From his investigation of the area, which showed that it had been inhabited from Archaic to Roman times, as well as from his observation of the landscape, Meyer concluded that only part of the mountain had collapsed, destroying the lower part of the city.

An earthquake at Delphi was formerly dated to 373 B.C. by Homolle (1896), on the basis of inscription *Syll.*³ 295, where there is a reference to the sanctuary at ll. 8-9: ἐπε[ι] ο ναὸς κατε[κα]ύθη. Its interpretation depends on how one completes the verb (Dittenberger reads κατεχάυθη “it was destroyed by fire”; Homolle reads κατεχύθη “it collapsed”). Homolle’s interpretation, that the inscription is referring to the famous disaster at Helice and Bura, has been accepted by Bousquet and Péchoux (1981, pp.47-50). Panessa (1991, pp.325-6) takes the more traditional view that it is referring to a fire in the temple, and he also rejects the archaeological evidence produced in the above studies.

<025> **shortly before 360 B.C. the island of Vulcano**
 ▷ **volcanic eruption, land uplift** ◁

sources Arist. *Mete.* 2.8.366 b-367 a

catalogues von Hoff (1840); Capelle (1924); Guidoboni (1989)

In support of his theory that earthquakes were caused by winds, Aristotle took an eruption which occurred on the island of Hieria (*Hiera Hephaistou* – modern Vulcano), in the Aeolian archipelago. The effects, he wrote, were still visible in his own day: “as evidence we may cite occurrences which have been observed in many places. For in some places there has been an earthquake which did not cease until the wind which was its motive force had broken out like a hurricane and risen into the upper region. This happened recently, for instance, in Heraclea in Pontus, and before that in Hieria, one of the Aeolian islands. For in this island part of the earth swelled up and rose with a noise in a crest-shaped lump; this finally exploded and a large quantity of wind broke out, blowing up cinders and ash which smothered the neighbouring city of Lipara, and even reached as far as some cities in Italy. The place where this eruption took place can still be seen”.

Σημεῖα δὲ τούτων καὶ πρὸς τὴν ἡμετέραν αἴσθησιν πολλαχῇ γέγονεν· ἤδη γὰρ σεισμὸς ἐν τόποις τισὶν γιγνόμενος οὐ πρότερον ἔληξε πρὶν ἐκρήξας εἰς τὸν ὑπὲρ τῆς γῆς φανερώς ὥσπερ ἐκνεφίας ἐξῆλθεν ὁ κινήσας ἄνεμος, οἷον καὶ περὶ Ἡράκλειαν ἐγένετο τὴν ἐν τῷ Πόντῳ νεωστί, καὶ πρότερον περὶ τὴν Ἰερὰν νῆσον· αὕτη δ' ἐστὶν μία τῶν Αἰόλου καλούμενων νήσων· ἐν ταύτῃ γὰρ ἀνῶδει τι τῆς γῆς, καὶ ἀνήει οἷον λοφώδης ὄγκος μετὰ ψόφου· τέλος δὲ ῥαγέντος ἐξῆλθεν πνεῦμα πολὺ καὶ τὸν φέψαλον καὶ τὴν τέφραν ἀνήκεν καὶ τὴν τε Λιπαραίων πόλιν οὖσαν οὐ πόρρω πάσαν κατετέφρωσε καὶ εἰς ἐνίας τῶν ἐν Ἰταλίᾳ πόλεων ἦλθεν· καὶ νῦν ὅπου τὸ ἀναφύσημα τοῦτο ἐγένετο, δῆλόν ἐστιν.

Aristotle places this eruption (and the preceding earthquake) before the earthquake which had “recently” struck Heraclea in Pontus. It seems likely that the latter occurred during Aristotle’s lifetime. Therefore, if we accept Capelle’s (1924, col.352) dating of the Heraclea earthquake to 360 B.C. (see entry < 026 >), we may assume that this earthquake and the accompanying eruption on the island of Vulcano occurred shortly before that.

< 026 > **c.360 B.C. Heraclea Pontica, ● Ophryneum, the Thracian Chersonese**

sources Demosth. *Contra Apat.* 33.20; Arist. *Mete.* 2.8.366 a-b
literature Autino (1987); Cohen and Burke (1990); Panessa (1991)
catalogues von Hoff (1840); Capelle (1924); Guidoboni (1989)

Demosthenes records the collapse of the house of Parmenion at Ophryneum, a city opposite the Thracian Chersonese: “After these events, then, a terrible tragedy struck Parmenion, O judges. For while he was living at Ophryneum, having fled from his country, there was an earthquake in the Chersonese, so that his house collapsed and his wife and children were killed”.

Μετὰ ταῦτα τοίνυν τῷ Παρμένοντι συνέβη συμφορὰ δεινὴ, ὃ ἄνδρες δικασταί. οἰκοῦντος γὰρ αὐτοῦ ἐν Ὀφρυνείῳ διὰ τὴν οἰκοθεν φυγὴν, ὅτε ὁ σεισμὸς ἐγένετο ὁ περὶ Χερρόνησον, συμπεσοῦσης αὐτῷ τῆς οἰκίας ἀπώλοντο ἡ γυνὴ καὶ οἱ παῖδες.

Since Demosthenes’ speech is related to a trial which took place after 355 B.C., a possible rough date for the earthquake would be about 360 (Panessa 1991, pp.304-5). Aristotle, too, may well be referring to this earthquake in his general remark about earthquakes in the Hellespont (*Mete.* 2.8.366 b): “Furthermore, the most violent earthquakes take place where the sea is subject to currents and the land is of a porous and cavernous kind. That is why they also occur in the Hellespont. Examples of such events have occurred in our lifetime. Thus an earthquake which occurred in certain places only ceased when the clouds broke and the wind which had driven them moved

away, as happened recently near Heraclea Pontica”.

Ἔτι δὲ περὶ τόπους τοιούτους οἱ ἰσχυρότατοι γίνονται τῶν σεισμῶν, ὅπου ἡ θάλαττα ῥωδῆς ἢ ἡ χώρα σομφῇ καὶ ὑπαντρος. διὸ καὶ περὶ Ἑλλάσποντον. Σημεῖα δὲ τούτων καὶ πρὸς τὴν ἡμετέραν αἰσθῆσιν πολλαχῇ γέγονεν· ἤδη γὰρ σεισμός ἐν τόποις τισὶ γιγνόμενος οὐ πρότερον ἔληξε, πρὶν ἐκρήξας εἰς τὸν ὑπὲρ γῆς τόπον φανερώς ὥσπερ ἐκνεφίας ἐξῆλθεν ὁ κινήσας ἄνεμος, διὸν καὶ περὶ Ἡράκλειαν ἐγένετο τὴν ἐν τῷ Πόντῳ νεωστί, καὶ πρότερον περὶ τὴν Ἰερὰν νῆσον· αὕτη δ' ἐστὶ μία τῶν Αἰόλου καλουμένων νήσων.

There remains some doubt, however, as to whether what Aristotle says about the Hellespont embraces what he says about Heraclea Pontica (see Panessa 1991, p.304): if the adverb νεωστί “recently” refers to the years immediately preceding the publication of the *Meteorologica*, the question arises as to when it was published, and the answer seems to be around 337 B.C., as far as the first three books are concerned (see Cohen and Burke 1990). We cannot assume, however, that the information recorded by Aristotle necessarily refers to a period very close to that date; for we know that he did not write his works uninterruptedly, but rather in a series of bursts and with the help of disciples. For example, when Aristotle refers in *Mete.* 3.371a to a fire in the temple of Artemis at Ephesus [356 B.C.] he uses the adverb νῦν (“now”), so that the date 356 is the first identifiable *terminus post quem* for the work. And in addition, we have to keep in mind that for ancient writers the concepts ‘recent’ and ‘new’ relate to longer periods of time than they do now. Hence Aristotle’s use of νεωστί may simply be a rhetorical means of indicating that the event did not occur in the distant past.

<027> c.347/346 B.C. Delphi

sources 1 Diod. 16.56.8; Strabo 9.3.8

sources 2 Ael. VH 6.9; Eus. PE 8.14.33

literature Homolle (1896); Bousquet and Péchoux (1981); Autino (1987); Panessa (1991)

catalogues Schmidt (1881); Capelle (1924); Papazachos and Papazachos (1989); Guidoboni (1989)

There is some evidence relating to the time of the third sacred war (357-346) in the mid-4th century B.C., to suggest that there was a certain amount of seismic activity affecting the Delphi sanctuary area, and that it interfered with attempts to rediscover buried treasure in the temple of Apollo.

According to Diodorus, this happened when Phalaecus was general of the Phocians, towards the end of the third sacred war [347/6]: “But as the soldiers were preparing to dig around the tripod, great earthquakes occurred which terrified the Phocians, and since the gods were clearly giving advance warning that they would punish these desecrators, they stopped work”.

Τῶν δὲ στρατιωτῶν ἐγχειρούντων σκάπτειν τὰ περὶ τὸν τρίποδα σεισμοὶ μεγάλοι γενομένοι τοῖς Φωκεῦσι φόβον ἐπέστησαν, φανερώς δὲ τῶν θεῶν προσεμαινόντων τὴν κατὰ τῶν ἱεροσύλων κόλασιν ἀπέστησαν τῶν ἔργων.

Strabo’s account of the episode is very similar, but he attributes it to the time when Onomarchus was general [354-352]. There is also a reference to the episode in Aelian.

In dating the earthquake, there is a tendency to prefer Diodorus’ evidence to that of Strabo. The French archaeologist Homolle (1896) thought he could identify archaeological evidence of the earthquake in the hurried rebuilding of the west side of the new temple at Delphi. He argued that this must be evidence of a second earthquake in the history of the sanctuary, the first having occurred in 373 (see entry <024>).

<028> last quarter of the 4th century B.C. Apamea

sources Strabo 12.8.18
catalogues Guidoboni (1989)

Strabo says that Apamea in Phrygia was frequently struck by earthquakes, not only in the 1st century B.C., but also in the days of Alexander: "Amongst other cities, Apamea was often struck by earthquakes before the expedition of Mithridates [Eupator, 88 B.C.]; and when he went there and saw the damage, he gave one hundred talents for rebuilding. And it is said that the same thing took place in the time of Alexander".

Καὶ τῶν ἄλλων δὲ πόλεων Ἀπάμεια μὲν καὶ πρὸ τῆς Μιτριδάτου στρατείας ἐσεισθη πολλάκις, καὶ ἔδωκεν ἐπελθὼν ὁ βασιλεὺς ἑκατὸν τάλαντα εἰς ἐπανόρθωσιν, ὁρῶν ἀνατετραμμένην τὴν πόλιν. λέγεται δὲ καὶ ἐπ' Ἀλεξάνδρου παραπλήσια συμβῆναι.

The reference to this earthquake leads on to a mention of the strong earthquake which struck Apamea at the time of the First Mithridatic War. See entry <057>.

<029> before 322 B.C. the Phlegrean Plain

sources Arist. *Mete.* 2.8.368b
literature Oberhummer (1941); Louis (1982); Panessa (1991)
catalogues Bonito (1691); Capelle (1924); Guidoboni (1989)

In listing various types of earthquake, Aristotle refers to tremors which come up from below: "whenever this type of earthquake does occur, large quantities of stones come to the surface, like the chaff in a winnowing sieve. This kind of earthquake it was that devastated the country round Sipylus: what is known as the Phlegrean Plain and the districts of Liguria".

Ὅπου δ' ἂν γένηται τοιοῦτος σεισμός, ἐπιπολάζει πλῆθος λίθων, ὥσπερ τῶν ἐν τοῖς λίκνοις ἀναβαττομένων· τοῦτον γὰρ τὸν τρόπον γενομένου σεισμοῦ τὰ τε περὶ Σίπυλον ἀνετράπη καὶ τὸ Φλεγραῖον καλούμενον πεδῖον καὶ τὰ περὶ τὴν Λιγυστικὴν χώραν.

The "Phlegrean Plain" has been identified both as the western end of the Chalcidian Peninsula in Greece (Louis 1982, p.99, note 2), called *Phlegra* and later on *Pallène*, and also as the volcanic region known as the *Campi Flegrei* (Phlegrean Fields) in Campania, Italy (Oberhummer 1941, col.265). The latter identification seems more likely, because the text specifically mentions a plain — something quite different from the mountainous terrain of the Chalcidian Peninsula (Panessa 1991, p.237, note 4).

<030> before 322 B.C. Liguria

sources Arist. *Mete.* 2.8.368b
catalogues Bonito (1691); Mercalli (1897); Capelle (1924); Guidoboni (1989)

In the passage quoted in entry <029>, Aristotle also states that other earthquakes similar to those in the Phlegrean region had occurred in the Sipylus range of mountains in Lydia and Ionia, and in the land of the Ligures: "whenever this type of earthquake does occur, large quantities of stones come to the surface, like the chaff in a winnowing sieve. This kind of earthquake it was that devastated the country round Sipylus what is known as the Phlegrean Plain and the districts of Liguria".

Ὅπου δ' ἂν γένηται τοιοῦτος σεισμός, ἐπιπολάζει πλῆθος λίθων, ὥσπερ τῶν ἐν τοῖς

λίκνοις ἀναβαττομένων· τοῦτον γὰρ τὸν τρόπον γενομένου σεισμοῦ τὰ τε περὶ Σίπυλον ἀνετράπη καὶ τὸ Φλεγραῖον καλούμενον πεδῖον καὶ τὰ περὶ τὴν Λιγυστικήν χώραν.

The Greek place-name *Ligustikè*, i.e. "Liguria", must be taken to refer to an area larger than the present-day Italian region. In fact, ancient Liguria extended beyond Liguria proper to Marseilles and the Rhone: in some (though exceptional) cases, the coast of Catalonia is described by Greek authors as part of "Liguria" (Capelle 1924, col.368).

The date we have given is simply a *terminus ante quem* provided by the death of Aristotle, for the exact date of the *Meteorologica* is much debated.

<031> **autumn-winter of 304-303 B.C. Ionia**

inscriptions *Marmor Parium FGrHist 239 B 24 = IG 12.5.444*

literature Chatelain (1909); Robert (1978); Panessa (1991)

catalogues Guidoboni (1989)

The *Marmor Parium* is a local chronicle preserved in an inscription. Amongst historical events worthy of note it also records some natural phenomena, including a report of seismic activity for the year 304-303 B.C.: "Starting with the earthquakes which occurred in Ionia".

[Ἀπὸ τῶν σεισμῶν τῶν γενομένων καθ' Ἰωνίαν.

The chronological position of the entry suggests earthquakes at the beginning of the year 304-303 B.C. Panessa (1991, p.284) points out that this is "the earliest historical evidence of earthquakes which can be confidently dated [for Asia Minor]". Unfortunately we have no supporting evidence from other sources.

<032> **287 B.C. •Lysimachia, the Hellespont, the Thracian Chersonese**

sources 1 Pomp. Trog. *apud Iust. Epit.* 17.1.1-3

sources 2 Oros. *Hist.* 3.23.57

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); Mallet (1853); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

In his *Epitome* of Trogus, Justinus records an earthquake which affected the Thracian Chersonese, the Hellespont and Lysimachia: "At about this time, there was an earthquake in the region of the Hellespont and the Chersonese, but it was the city of Lysimachia, founded by king Lysimachus twenty-two years earlier, which was worst affected, being reduced to ruins. This was a bad omen for Lysimachus and his house, for it not only caused havoc in the regions where it was felt, but was also a portent of his own fall from power".

Per idem ferme tempus, Hellesponti et Chersonesi regionibus terrae motus fuit, maxime tamen Lysimachia urbs, ante duos et viginti annos a Lysimacho rege condita, eversa est. Quod portentum dira Lysimacho stirpique eius ac regni ruinam cum clade vexatarum regionum portendebat.

The earthquake is interpreted as a blow of fate, the city being destroyed only twenty-two years after its foundation. For other earthquakes of uncertain date in the Hellespont area, see entry <026> above.

<033> **autumn-winter of 279 B.C. Delphi ▷landslide◁**

- sources** Pomp. Trog. *apud* Iust. *Epit.* 24.8.9; Paus. 10.23.1
literature Péchoux (1977); Bousquet and Péchoux (1981); Bearzot (1989)
catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Galanopoulos (1961); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

A landslide probably caused by an earthquake prevented Brennus and his Gauls from sacking the sanctuary at Delphi. In his *Epitome* of Trogus, Justinus writes: "They [the enemy], too, immediately felt the presence of the god, for part of a mountain broke off in an earthquake and fell on the Gaulish army, and a heavy rain of sharp stones descended, causing some casualties amongst them".

Praesentiam dei et ipsi statim sensere, nam et terrae motu portio montis abrupta Gallorum stravit exercitum et confertissimi cunei non sine vulneribus ostium dissipati ruebant.

Pausanias also mentions that an earthquake struck Brennus and his Gauls during an expedition against Delphi: "The Greeks who had mustered at Delphi drew up in order of battle against Brennus and his army, and the gods soon sent the barbarians disaster warnings of the plainest kind. Thus the area occupied by the Gaulish army was heavily shaken for most of the day; and there was continual thunder and lightning".

Βρέννω δὲ καὶ τῇ στρατιᾷ τῶν τε Ἑλλήνων οἱ ἐς Δελφοὺς ἀθροισθέντες ἀντετάξαντο, καὶ τοῖς βαρβάροις ἀντεσήμαινε τὰ ἐκ τοῦ θεοῦ ταχύ τε καὶ ὦν ἴσμεν φανερώτατα. ἥ τε γὰρ γῆ πᾶσα, ὅσῃν ἐπεῖχεν ἡ τῶν Γαλατῶν στρατιά, βιαίως, καὶ ἐπὶ πλεῖστον ἐσειέτο τῆς ἡμέρας, βρονταί τε καὶ κεραυνοὶ συνεχεῖς ἐγίνοντο.

According to Bearzot (1989, pp.73-7), this passage from Pausanias is unreliable because it seems to be inspired by similar passages in Herodotus; but such an argument is itself not always satisfactory, because *mimesis* amongst ancient authors is a constant of classical historiography. For the seismicity of Parnassus, see Péchoux (1977) and Bousquet and Péchoux (1981, p.51, with bibliography).

<034> **268 B.C. Picenum**

- sources** Frontin. *Strat.* 1.12.3; Flor. 1.14.2; Oros. *Hist.* 4.4.5-7
literature Lippold (1976); Traina (1994 a)
catalogues Manetti [1457]; Filippo da Secinara (1652); Bonito (1691); Abbati (1703); von Hoff (1840); Mallet (1853); Schmidt (1881); Mercalli (1883); Guidoboni (1989)

An earthquake occurred during the decisive battle between the Roman army and that of the Piceni in 268 B.C.; and there is a certain analogy between the account of this earthquake and that of the 217 B.C. earthquake during the battle of Lake Trasimeno between the Romans and the Carthaginians (see entry <038>). The former battle sealed the victory of the consul Sempronius Sophus over the Piceni, and gave the Romans control of Ascoli and the stretch of the Adriatic coast between the rivers Esino and Salino.

The most detailed description of the earthquake is to be found in Paulus Orosius. Although he is the latest of all the sources (5th century A.D.), his own sources were excellent. After mentioning some prodigies for the year 478 *ab Urbe condita* in Rome and Cales, he goes on as follows: "The next year, the consul Sempronius led an army against the Piceni; and when the two sides were within spear range, the earth suddenly shook with a terrifying roar, with the result that both forces were struck with fear at such a prodigy, and stood dumbfounded. For a long time the troops on both

sides hesitated in amazement, feeling that this was a judgment on their undertaking; but finally they hurled themselves into action. So terrible was the conflict that it could rightly be said that the earth trembled with a terrifying moan, because it realised that it was to receive so much human blood".

Sequenti abhinc anno Sempronius consul adversum Picentes duxit exercitum. Et cum directae intra iactum teli utraque acies constitisset, repente ita cum horrendo fragore terra tremuit, ut stupore miraculi utrumque pavefactum agmen hebesceret. Diu attenti utrimque populi haesitare praeiudicata incepti conscientia; tandem procursu concito iniere certamen. Triste adeo id bellum fuit, ut merito dicatur tantum humanum sanguinem susceptura etiam cum gemitu horrisson tunc terra tremuisse.

The chronological scheme used in this passage is not that usually adopted by Paulus Orosius and based on a dating of the foundation of Rome to 752 B.C., following the *Fasti Capitolini* and Fabius Pictor. If that were the case, he would be dating the earthquake to 274 B.C., which would clash with other parallel accounts of the same event. The dating to 479 *ab Urbe condita* is not a mistake, in fact, for it has been pointed out that in this part of the *Historiae adversus paganos* Orosius adopts a different chronological scheme, dating the foundation of Rome to 747 B.C., as he does in certain other passages as well (Lippold 1976, II, pp.467-8). There is thus no doubt that the date of the battle and the earthquake is 268 B.C.

There may be echoes of an annalistic source in Orosius' account; and there are certainly such echoes in Florus' brief reference to the earthquake: "When the earth shook during the battle, he [Sempronius Sophus] placated the goddess Earth by promising her a temple".

Qui tremente inter proelium campo Tellurem deam promissa aede placavit.

The temple to Tellus was indeed built in Rome that year: at the foot of the Esquiline between the Fagutal and the Carinae. Consul Sempronius Sophus' triumph is recorded in other sources as having taken place that year, but none of them mentions the earthquake.

It is likely that both Orosius and Florus drew on the same annalist, for a comparison between the two passages does not reveal any substantial divergences, in spite of their quite different nature. It is true that the earthquake is interpreted differently by the two writers; but that can be accounted for in terms of Orosius' selective use of material as a Christian. He omits the details of Sempronius' promise, but stresses the bloody nature of the battle, in which a great deal of pagan Roman blood was spilled.

The tradition of Frontinus seems to be different. In his *Strategemata*, written during the reign of Domitian (81-96 A.D.), he mentions that the earthquake struck terror into both armies. But it was apparently then that the consul urged his men to take advantage of the panic aroused in the enemy by their *superstitio*, and attack. Thanks to this timely exhortation, Sempronius was apparently victorious all along the line: "When the consul T.Sempronius Gracchus was engaged in battle with the Piceni, a sudden earthquake threw both armies into a state of alarm".

T.Sempronius Gracchus consul, acie adversus Picentes directa, cum subitus terrae motus utrasque partes confudisset.

This tradition is certainly anecdotal, and less careful than the others in historical terms. The text which has come down to us wrongly names the consul as T(itus) Sempronius Gracchus; but this is probably a simple scribal error, at least as regards the *praenomen* Titus, which was unusual for the Sempronii Gracchi. Furthermore, there is nothing here to establish a connection with T(iberius) Sempronius Gracchus, who was consul in 238.

(035) c.228-224 B.C. ●Cytinium, ●Doris, the northern coast of Boeotia
 ▷seismic sea-wave?◁

sources Pol. 20.5.7
 inscriptions Bousquet (1988)
 literature Bousquet and Péchoux (1981); Robert (1978); Panessa (1991)
 catalogues Guidoboni (1989)

There is an inscription, found at Xanthus in Lycia and datable to the 3rd century B.C., containing a letter from the Dorians of Cytinium — the chief city of Doris, a small region on the northern slopes of Mt.Parnassus, in central Greece — which mentions an earthquake and asks for financial assistance from their blood brothers at Xanthus: "The Dorians of the Metropolis who live at Cytinium send greetings to the *Boule* and people of Xanthus. We and the Aetolians have sent as ambassadors to you Lamprias son of Pancles, Aenetus son of Polyas and Phegeus son of Sotion to give you a personal report in accordance with their instructions. At the time when king Antigonos invaded Phocis, parts of the walls of all our cities had collapsed in earthquakes and our young men had rushed for help to the sanctuary of Apollo at Delphi. When the king reached Doris, he destroyed the walls of all the cities and burned the houses. We therefore beg you to be mindful of our relationship to you, and not to remain indifferent to the ruins of Cytinium, the chief city of our country, but to give us all the help you can to rebuild the city walls, and to demonstrate to the Greeks your goodwill towards our people and our city, by helping us to find resources in a manner worthy of our ancestors, of you yourselves, of Heracles and of his descendants. For our part, we shall render thanks to you as you may require. You should know that you are regarded with favour not only by us but also by the Aetolians and the other Dorians, and especially by king Ptolemy, because of our relationship through our kings".

Δωριέων τῶν ἀπὸ / Ματροπόλιος οἱ πόλιν Κυτένιον οἰκέοντες Ξανθίων τῇ βου/λαῖ
 καὶ τῇ δάμῳ χαίρειν./ἀπεστάλκαμες ποθ' ὑμὲ πρέσ/βεις καὶ ἀμεῖς καὶ τοῖ Αἰτωλοῖ
 Λαμπρίαν [Π]ανκλέος, Αἵνετον / Πολύτα, Φηγέα Σωτίωνος τοὺς διαλεγησομένους περὶ
 ὧν / ἔχοντι τὰς ἐντολάς· συμβαίνει γὰρ ἀμῶν, καθ' ὃν καιρὸν / ὁ βασιλεὺς Ἀντίγονος
 ἐνέβαλε ἐν τὰν Φωκίδα, τῶν τε / τειχέων μέρη τινὰ καταπεπτώκειν ὑπὸ τῶν σεισμῶν
 πα/σάν τὰμ πόλιν καὶ τοὺς νεωτέρους εἰσβοαθοῆκεν ἐν τὸ ἱερὸ(ν) τοῦ Ἀπόλλωνος
 τοῦ ἐν Δελφοῖς· παραγενόμενος δὲ ὁ βασιλεὺς ἐν τὰν Δωρίδα τὰ τε τείχη ἀμῶν
 κατέσκαψε πασάν / τὰμ πόλιν καὶ τὰς οἰκίας κατέκαυσε· ἀξιάζομες οὖν ὑμὲ /
 μνασθέντας τὰς συγγενείας τὰς ὑπαρχούσας ἀμῖν / ποθ' ὑμὲ μὴ περιδεῖν τὰμ
 μεγίσταν τὰν ἐν τῇ Ματροπόλῳ πόλιν Κυτένιον ἐξαλειφθεῖσαν, ἀλλὰ βοαθοῆσαι ἀμῖν
 ἐν [τὸν] / τειχισμόν τὰς πόλιος καθ' ὃ κα δυνατόν ὑμῖν φαίνεται εἶ[ν]/μεν, καὶ φανεράν
 ποιῆσαι τοῖς Ἑλλάνοις τὰμ παρ' ὑμῶν εὐνοια[ν] / ποτί τε τὸ ἔθνος
 ἀμῶν καὶ τὰμ πόλιν, συναντιλαβομένους ἀξίως / καὶ τῶν προγόνων καὶ ὑμῶν αὐτῶν
 καὶ τοῦ Ἡρακλέος καὶ τῶν ἀπογόνων αὐτοῦ· καὶ ἀμεῖς δὲ χάριτας ἀποδωσέμες καθ'
 ὃ κα παρακά/λητε· γινώσκετε δὲ οὐ μόνον ἀμῖν εὐχαριστῆς εόντες ἀλλὰ καὶ / [τοῖς
 Αἰτωλοῖς καὶ τοῖς ἄλλοις Δωριέοις πᾶσι καὶ μάλιστα βασιλεῖ / Πτολεμαίῳ διὰ τὸ
 συγγενῇ ἀμῶν εἶμεν κατὰ τοὺς βασιλεῖς.

The inscription shows that seismicity was not confined to the southern slopes of Mt.Parnassus, where we have noted it in relation to Delphi, but was also particularly strong and destructive on the other side, where Doris was situated.

The fact that the inscription mentions the need to rebuild collapsed city walls suggests that this was an earthquake of some intensity. There were multiple shocks and nearby cities also lost part of their walls. All this happened when the troops of Antigonos Doson were invading Phocis. Bousquet (1988) relates this earthquake to those which struck Melitaea, on the north side of the Othrys mountains, in the seismic

area centred on Atalante and Thermopylae. Apparently the king of the Athamanes gave ten silver talents on this occasion, towards the rebuilding of the walls at Melitaea. Bousquet thinks it likely that the damage was caused between 228 and 224 B.C. This is the period of the famous earthquake at Rhodes (see entry < 036 >); but it seems unlikely that the two earthquakes are connected, given the distance between the two areas and the frequency of earthquakes in Doris (Panessa 1991, pp.327-8). There may be a connection between this earthquake and the receding of the sea in the gulf of Larymna, at the northern end of Boeotia, as recorded by Polybius: "Antigonus had become Philip's guardian after the death of Demetrius, and he was sailing on official business to Larymna at the tip of Boeotia when, as a result of an extraordinary receding of the sea, his vessels found themselves on dry land".

Ἀντίγονος μετὰ τὸν Δημητρίου θάνατον ἐπιτροπεύσας Φιλίππου, πλέων ἐπὶ τινὰς πράξεις πρὸς τὰς ἐσχατίας τῆς Βοιωτίας πρὸς Λάρυμναν, παραδόξου γενομένης ἀμπώτεως ἐκάθισαν εἰς τὸ ξηρὸν αἱ νῆες αὐτοῦ.

< 036 > **c.227 B.C. • Camirus, • Rhodes, • the island of Telos, • Caria, • Lycia**

- sources 1 Pol. 5.88.1-4; Paus. 2.7.1
sources 2 Diod. *Frag.* 26.4.8; Strabo 14.2.5; Plin. *n.h.* 34.41; *Orac. Sibyll.* 4.101; Eus. *Hieron. Chron.* 134a; Oros. *Hist.* 4.13.13; *Chron. Pasch.* 175; Georg. *Sync.* 525; Cedren. 264
inscriptions *SGDI* 3486; *IG* 12.1.708 = *Syll.*³ 505
literature Torr (1885); Hiller von Gaertringen (1931); Robert (1978); Adam and Blanc (1989); Panessa (1991)
catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Capelle (1924); Sieberg (1932 a); Galanopoulos (1960); Shebalin *et al.* (1974); Ben-Menahem (1979); Papazachos and Papazachos (1989); Guidoboni (1989)

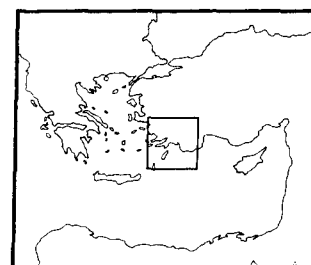
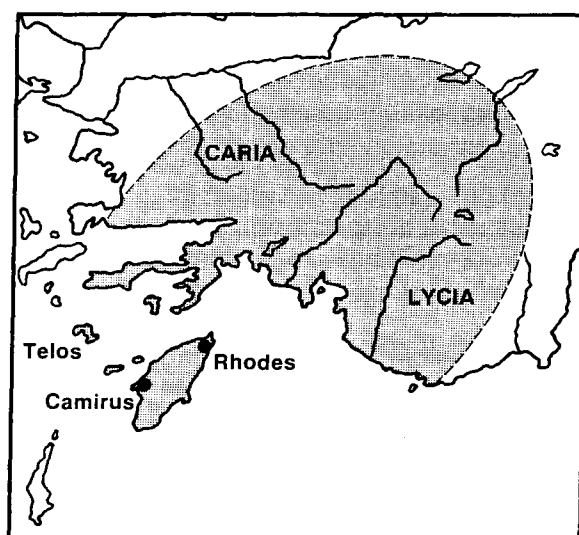
This is the disastrous earthquake which caused the famous Colossus of Rhodes to collapse, and also struck Lycia and Caria, and probably the island of Telos as well. Polybius (5.88.1-4) describes the earthquake in most detail, and he tells how the disaster redounded to the benefit of the city, because the generous help given by their neighbours was one of the earliest significant examples of "international solidarity" known to us: "At about the time I have been speaking of, the Rhodians, availing themselves of the pretext of the earthquake which had occurred a short time previously, and which had caused the collapse of their great Colossus and most of the walls and arsenals, made such sound practical use of the incident that the disaster was a cause of improvement to them rather than of damage.

So great is the difference both to individuals and states between caution and wisdom on the one hand, and folly with negligence on the other, that in the latter case good fortune actually inflicts damage, while in the former disaster is the cause of profit. The Rhodians at least so dealt with the matter, that by laying stress on the greatness of the calamity and its dreadful character, and by conducting themselves at public audiences and in private meetings with the greatest seriousness and dignity, they had such an effect on cities and especially on kings, that not only did they receive most lavish gifts, but the donors themselves felt that a favour was being conferred on them".

Ῥόδιοι δὲ κατὰ τοὺς προειρημένους καιροὺς ἐπειλημμένοι τῆς ἀφορμῆς τῆς κατὰ τὸν σεισμὸν τὸν γενομένου παρ' αὐτοῖς βραχεῖ χρόνῳ πρότερον, ἐν ᾧ συνέβη τὸν τε κολοσσὸν τὸν μέγαν πεσεῖν καὶ τὰ πλεῖστα τῶν τειχῶν καὶ τῶν νεωρίων. οὕτως ἐχείριζον νουνεχῶς καὶ πραγματικῶς τὸ γεγονὸς ὥς μὴ βλάβης, διορθώσεως δὲ μᾶλλον,

αὐτοῖς αἴτιον γενέσθαι τὸ σύμπτωμα. τοσοῦτον ἄγνοια καὶ ῥαθυμία διαφέρει παρ' ἀνθρώποις ἐπιμελείας καὶ φρονήσεως περί τε τοὺς κατ' ἰδίαν βίους καὶ τὰς κοινὰς πολιτείας, ὥστε τοῖς μὲν καὶ τὰς ἐπιτυχίας βλάβην ἐπιφέρειν, τοῖς δὲ καὶ τὰς περιπετείας ἐπανορθώσεως γίνεσθαι παραιτίας. οἱ γοῦν Ῥόδιοι τότε παρὰ τὸν χειρισμὸν τὸ μὲν σύμπτωμα ποιοῦντες μέγα καὶ δεινόν, αὐτοὶ δὲ σεμνῶς καὶ προστατικῶς κατὰ τὰς πρεσβείας χρώμενοι ταῖς ἐντεύξεσι καὶ ταῖς κατὰ μέρος ὁμιλίαις, εἰς τοῦτ' ἤγαγον τὰς πόλεις, καὶ μάλιστα τοὺς βασιλεῖς, ὥστε μὴ μόνον λαμβάνειν δωρεὰς ὑπερβαλλούσας, ἀλλὰ καὶ χάριν προσοφείλιν αὐτοῖς τοὺς διδόντας.

Polybius (5.88.5-90.4) goes on to specify the lavish grants and gifts offered to Rhodes by other kings and tyrants, such as Hiero and Gelo of Syracuse, Ptolemy IV of Egypt and Antigonus of Macedonia. Diodorus also mentions assistance offered to the people of Rhodes by Hiero.



c.227 B.C.

According to Pausanias, the earthquake struck not only Rhodes but the neighbouring regions of Caria and Lycia: "The same earthquake also damaged the cities of Lycia and Caria, and the shock was particularly felt in the island of Rhodes, so the Sibylline oracle concerning Rhodes appeared to have been fulfilled".

Ἐκάκωσε δὲ καὶ περὶ Καρίαν καὶ Λυκίαν τὰς πόλεις καὶ Ῥοδίοις ἐσειέσθη μάλιστα ἡ νῆσος, ὥστε καὶ τὸ λόγιον τετελέσθαι Σιβύλλῃ τὸ ἐς τὴν Ῥόδον ἔδοξεν.

What the *Sibylline Oracles* in fact had to say was: "Rhodes too will have its last but greatest disaster".

Ἦξει καὶ Ῥοδίοις κακὸν ὕστατον, ἀλλὰ μέγιστον.

There is a certain amount of disagreement about the date of this earthquake. Polybius gives the latest date, placing it in a year shortly before 219/218 B.C. Diodorus, on the other hand, places it in 227/6 B.C., while Pliny claims that the Colossus collapsed in an earthquake sixty-six years after it had been erected. However, there is some uncertainty about Pliny's text at this point, and the somewhat debated critical reading gives fifty-six years later. Hence, if the Colossus was dedicated in 290, it collapsed either in 224/3 or in 234/3.

Different datings can also be found amongst modern scholars, ranging from 222 B.C. (Capelle 1924, col.354) to "about 227" (Torr 1885, p.15), and 227 or 226 B.C. (Hiller von Gaertringen 1931, col.785).

There is, an inscription (SGDI 3486) from Telos, dating to the 2nd century B.C., which records that it too was struck by the earthquake: "Decree of the Telians, as proposed

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catalogue 227 B.C.

by the high priest. Since Aristomenes of Telos, son of Aristobulus, has in the past always behaved in an exemplary fashion towards the people of Telos, to their frequent and considerable advantage, and then, when chosen as high priest under the ministry of Aglocritus, administered with fairness and justice all income and contributions, and subsequently, when an earthquake occurred and houses, walls and towers collapsed, dedicated himself with zeal to the work of sound and useful reconstruction, not only granting without hesitation contributions previously given, but also providing unstinting assistance in everything [---].

[Ἔδοξε Τηλίους, ἱεραπόλου γνῶμα. ἐπειδὴ Ἀριστομένης Ἀριστοβούλου [Τή]λιος ἔν τε τῷ πρότερον χρόνῳ ἀνὴρ ἀγαθὸς [ἔων / δι]ετέλει περὶ τὸν δᾶμον τὸν Τηλίων πολλὰς καὶ μεγάλας [χρεί/α]ς τῷ κοινῷ παρεχόμενος, αἰρεθεὶς τε ἱεραπόλος ἐπ' ἱερεῦς / Ἀγλωκρίτου [πάσα]ς τὰς ποθόδους καὶ τὰ τελέσματα ὀρθῶς / καὶ] δικαίως <ὦ [κλον]όμησε, σεισμῷ τε γενομένου καὶ [οἰκων / κ]αὶ τῶν τειχέων καὶ τῶν πύργων διασεισθέντων πᾶσαν [σπουδ]ὰν καὶ φιλοτιμίαν ἐποίησατο εἰς τὸ ἀνοικοδομηθῆμεν / [τὰ] ποτιδεόμενα ἐπισκευᾶς καλῶς καὶ λυσιτελῶς, οὐ μόνον τὰ / γεινόμενα [εἰς] ταῦτα τελέσματα διδούς ἀπροφασίστως, ἀλλὰ / καὶ καθ' αὐτὸν χρεῖαν ἐν πᾶσιν ἐκτενῇ παρεχόμενος καὶ ---].

There is also an inscription (IG 12.1.708 = Syll.³ 505) found at Camirus in the island of Rhodes, on a hill pertaining to the necropolis, and possibly dating to the 3rd century B.C. With reference to Camirus, it states: "[Altar] of those who died in the earthquake".

Τῶν κατὰ τὸν σεισμὸν τελευτασάντων.

This last inscription in particular could perhaps be referring to the subsequent earthquake at Rhodes in 199-198. See the relevant entry for further information concerning the dating of other inscriptions.

Since the Colossus was one of the "seven wonders of the world", the earthquake which destroyed it is mentioned in a number of sources. The earliest references are in Strabo and Pliny. Strabo says: "The Colossus was broken off at knee height by the earthquake, and now lies flat on the ground".

Κεῖται δὲ νῦν ὑπὸ σεισμῷ πεσὼν περικλασθεὶς ἀπὸ τῶν γονάτων.

The fame of the Colossus is confirmed by Pliny, who writes: "The Colossus of the Sun at Rhodes was wondered at by everyone. It was made by Chares Lindius, who was a pupil of Lysippus, mentioned above. The statue was seventy cubits high and was knocked down sixty-six years later by an earthquake; but it still remains an object of wonder".

Ante omnes autem in admiratione fuit Solis colossus Rhodi, quem fecerat Chares Lindius, Lysippi supra dicti discipulus. LXX cubitorum altitudinis fuit hoc simulacrum, post LXVI annus terrae motu prostratum, sed iacens quoque miraculo est.

<037> **June 217 B.C. • Cisalpine Gaul, • Liguria**
 ▷ seismic sea-wave, landslides, diversion of rivers ◁

sources Coel. Antip. fr. 20 Peter, *apud* Cic. *De div.* 1.35.78
 catalogues Mercalli (1897); Guidoboni (1989)

Of the numerous Latin and Greek sources which record an earthquake at the same time as the battle of Lake Trasimeno between Hannibal and the Romans (see entry <038>), only Coelius Antipater, a 2nd century B.C. historian of whose works only a few fragments survive (the one which concerns us is recorded by Cicero), mentions that

there were also earthquakes in Liguria and Gaul: "Coelius has added the further notable fact that, at the very time this disastrous battle was going on, earthquakes of such violence occurred in Liguria, in Gaul, on several islands, and in every part of Italy, that a large number of towns were destroyed, landslips took place in many regions, the earth sank, rivers flowed upstream, and the sea invaded their channels".

Magnum illud etiam quod addidit Coelius, eo tempore ipso, cum hoc calamitosum proelium fieret, tantos terrae motus in Liguribus, Gallia compluribusque insulis totaque in Italia factos esse, ut multa oppida conruerint, multis locis labes factae sint terraeque desederint fluminaque in contrarias partes fluxerint atque in amnes mare influxerit.

As far as Gaul is concerned, the fragment of Coelius Antipater may well refer only to Cisalpine Gaul: in other words, northern Italy. Since Liguria is a long way from Lake Trasimeno, it is very likely that we are dealing with two separate events.

<038> **June 217 B.C. Lake Trasimeno, Etruria**
▷landslides, diversion of rivers◁

- sources Coel. Antip. fr. 20 Peter, *apud* Cic. *De div.* 1.35.78; Liv. 22.5.8; Plin. *n.h.* 2.200; Flor. 1.22.14; Plut. *Fab. Max.* 3.2; Dio Cass. 14 *apud* Zon. 8.25; Oros. *Hist.* 4.15.6
- catalogues Manetti [1457]; Filippo da Secinara (1652); Bonito (1691); Abbati (1703); von Hoff (1840); Mallet (1853); Schmidt (1881); Mercalli (1883); Guidoboni (1989)

A variety of different seismic events in widely scattered locations are recorded for 217 B.C. There is evidence of a tremor being felt near Lake Trasimeno, and written sources say that it coincided with the battle between Romans and Carthaginians. They all agree that it was a very violent earthquake and that it affected many areas, causing substantial damage to the countryside.

The earliest source is Coelius Antipater, a 2nd century B.C. historian of whose work only a few fragments survive. The one which concerns us is recorded by Cicero: "Coelius has added the further notable fact that, at the very time this disastrous battle was going on, earthquakes of such violence occurred in Liguria, in Gaul, on several islands, and in every part of Italy, that a large number of towns were destroyed, landslips took place in many regions, the earth sank, rivers flowed upstream, and the sea invaded their channels".

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In Livy's description of the battle, however, the soldiers are quite unaware of the earthquake: "The soldiers were so frenzied and so intent on the battle that none of them noticed the earthquake, though it destroyed large parts of many Italian cities, changed the course of swift-flowing streams, cause the sea to flow back into rivers, and produced great mountain landslides".

Tantusque fuit ardor animorum, adeo intentus pugnae animus, ut eum motum terrae, qui multarum urbium Italiae magnas partes prostravit avertitque cursu rapidos amnes, mare fluminibus invexit, montes lapsu ingenti proruit, nemo pugnantium senserit.

Florus records: "for swarms of bees settling on our standards and the reluctance of the eagles to advance, and a violent earthquake which ensued upon the beginning of the

engagement — and perhaps it was the rush of horses and men and the unusually violent clash of arms which caused this trembling of the earth — had warned its rash commander of the impending disaster”.

Inminentem temerario duci cladem praedixerant insidentia signis examina et aquila prodire nolentes et commissam aciem secutus terrae tremor; nisi illum horrorem so-
equitum virorumque discursus et mota vehementius arma fecerunt.

According to Plutarch: “But as Flaminius himself sprang upon his horse, the animal was inexplicably seized with quivering fright, and he was thrown headlong to the ground. This did not cause him to abandon his plans in any way, however, for he had set out at the beginning to confront Hannibal, and he now drew up his forces near the lake called Thrasymenté, in Tuscany.

When the soldiers of both armies had engaged, at the very crisis of the battle, an earthquake occurred, which destroyed cities, diverted rivers from their channels, and tore away fragments of cliffs. And yet, although the disaster was so violent, none of the combatants noticed it at all”.

Αὐτὸς δ' ἐπὶ τὸν ἵππον ἀλάμενος, ἐξ οὐδενὸς αἰτίου προδήλου παραλόγως ἐντρόμου τοῦ ἵππου γενομένου καὶ πυρέντος, ἐξέπεσε καὶ κατενεχθεὶς ἐπὶ κεφαλὴν ὅμως οὐδὲ ἔτρεψε τῆς γνώμης, ἀλλ' ὥς ὥρμησεν ἐξ ἀρχῆς ἀπαντῆσαι τῷ Ἀννίβᾳ, περὶ τῇ καλουμένῃ Θρασυμενίαν λίμνῃ τῆς Τυρρηνίας παρετάξατο. Τῶν δὲ στρατιωτῶν συμβαλόντων εἰς χεῖρας, ἅμα τῷ καιρῷ τῆς μάχης συνέπεσε σεισμός, ὑφ' οὗ καὶ πόλεις ἀνετράπησαν καὶ ρεύματα ποταμῶν ἐξ ἑδρας μετέστη καὶ κρημνῶν ὑπώρειοι περιερράγησαν. Ἀλλὰ καίπερ οὕτω γενομένου βιαίου τοῦ πάθους οὐδεὶς τῶν μαχομένων παραπάν ἤσθετο τῶν μαχομένων.

Dio Cassius (this part of his history is preserved, in a somewhat abridged form, in the work of the Byzantine historian Zonaras) records: “So great was the uproar and such the confusion and alarm that seized them, that they were not even aware of the earthquakes then occurring, although many buildings fell in ruins and many mountain peaks were either split open or collapsed so that they blocked up the ravines, and rivers shut off from their ancient outlets turned elsewhere. Such were the earthquakes which overwhelmed Etruria, yet the combatants were not conscious of them”.

τοσοῦτος δ' ἐγένετο θόρυβος καὶ τοιαύτη ταραχώδης ἑκπληξίς κατέσχευ αὐτοὺς ὥστε καὶ μὴ τῶν σεισμῶν τῶν τότε γενομένων αἰσθῆσθαι, καίπερ πολλὰ μὲν οἰκοδομήματα κατερράγη, πολλὰ δὲ καὶ τῶν ὄρων τὰ μὲν διέσχε, τὰ δὲ καὶ συνέπεσεν, ὥς καὶ τὰ φάραγγας ἐμφράξαι, καὶ ποταμοὶ δὲ τῆς ἀρχαίας ἐξόδου ἀποκλεισθέντες ἄλλῃ ἐτράποντο. τοιοῦτοι μὲν σεισμοὶ τὴν Τυρσηνίδα κατέσχεον, οὐ μὲντοι καὶ οἱ μαχομένοι ἐν ἐννοίᾳ σφῶν ἐγένοντο.

Orosius elaborates on his sources in the following terms: “The battle at Lake Trasimeno was famous as a great disaster for the Romans, but also because it was fought with such intensity and ferocity that the soldiers were totally unaware of an earthquake which took place at the same time. Its violence was such that it is said to have destroyed cities, moved mountains, split rocks open and forced rivers to flow backwards”.

Famosum hoc apud Trasumennum lacum certamen fuit tanta clade Romana, maximam cum ita intentus pugnantum ardor extiterit, ut gravissimum terrae motum, qui tunc forte tam vehemens factus est, ut urbes diruisset, montes transtulisset, discidisset rupes et flumina retrorsum coegisset referatur, pugnantes omnino non senserint.

This severe earthquake was probably not an isolated event, for Pliny records that the earth shook as many as fifty-seven times that year, and that earthquakes were never more frequent than at that time: “the greatest frequency was during the Punic War

when reports reached Rome of fifty-seven in a single year; and it was in that very year that, as they fought at Lake Trasimeno, neither Carthaginians nor Romans noticed a severe earthquake”.

Creberrimus Punico bello intra eundem annum septies ac quinquagies nuntiatus Romam, quo quidem anno ad Trasimenum lacum dimicantes maximum motum nec Poeni sensere nec Romani.

The sources give no precise indication as to where the earthquakes were felt, though it is clear that many different places were affected over a wide area. The one locality mentioned in all the sources is Lake Trasimeno. Dio Cassius mentions “Etruria” but, as can be seen from Plutarch, the term indicated an area extending to Lake Trasimeno.

The various sources record the effects of the earthquake on the land: rivers flowed backwards, large-scale landslides occurred and many towns were destroyed. Coelius Antipater and Livy add a descriptive detail which is lost in the later tradition: they tell us that the sea “went back” into the mouths of rivers. This clearly suggests a seismic sea-wave, but unfortunately we cannot tell where it occurred.

As is so often the case with evidence of this kind from ancient sources, geographical references are very broad and territorial limits cannot be precisely identified, with the result that it is impossible to establish where exactly these great earth disturbances recorded in the sources took place. All we can reasonably do, then, is to accept the evidence that in the summer of 217 B.C. there were several very severe earthquakes, with frequent after-shocks, as Pliny tells us, and that, roughly speaking, they took place in the northern part of the Tyrrhenian coastal area. One of the tremors was apparently also felt in the inland area of the Apennines — near Lake Trasimeno, for example — but it was not sufficiently powerful to distract the troops engaged in battle.

〈039〉 199–198 B.C. ● Sidon, Phoenicia, Syria

sources Posid. F 12 a Theiler

catalogues Bonito (1691); Guidoboni (1989)

There is a fragment of Posidonius which records that a series of shocks was felt in the region of Sidon and, less strongly, in Syria: “As a result of an earthquake in Phoenicia, a city above Sidon was swallowed up, and almost two thirds of Sidon itself collapsed, but the number of victims was limited, because it did not happen in a single shock. The same disaster struck the whole of Syria, but with moderate intensity”.

Ἐν δὲ τῇ Φοινίκῃ [...] γενομένου σεισμοῦ καταποθῆναι πόλιν ἰδρυμένην ὑπὲρ Σιδῶνος, καὶ αὐτῆς δὲ Σιδῶνος σχεδόν τι τὰ δύο μέρη πεσεῖν, ἀλλ’ οὐκ ἀθρόως, ὥστε μὴ πολὺν φθόρον ἀνθρώπων γενέσθαι. Τὸ δ’ αὐτὸ πάθος καὶ ἐπὶ τὴν Συρίαν ὅλην διέτεινε, μετρίως δέ πως.

In view of the fragmentary nature of the source, there is nothing we can add. Posidonius was born about sixty years after the event, and as one of the greatest scholars of his time, his testimony is undoubtedly authoritative.

〈040〉 199–198 [260?] B.C. Chalcis, Euboea ▷eruption◁

sources Posid. F 12 a Theiler; Asclepiodot. *apud* Sen. *NQ* 6.17.2-3; Strabo 10.1.9

literature Panessa (1991); Reinders (1992)

catalogues Bonito (1691); Guidoboni (1989)

catalogue 217–199 B.C.

After describing a series of shocks in the Sidon area, Posidonius records an earthquake which caused a temporary interruption in the flow of a spring at Calcis in the island of Euboea. The earthquake was followed by an eruption: "[The disaster] also struck some of the Cyclades islands and Euboea, with the result that the springs of Arethusa (in Calcis) were obstructed. Some days later the water appeared from a different orifice, while various parts of the island continued to feel shocks. And then a chasm opened up in the Lelantean plain and vomited forth a river of burning lava".

διέβη δὲ καὶ ἐπὶ τινὰς νήσους τὰς Κυκλάδας καὶ τὴν Εὐβοίαν, ὥστε τῆς Ἀρεθούσης (ἔστι δ' ἐν Χαλκίδι κρήνη) τὰς πηγὰς ἀποτυφλωθῆναι, συχνᾶς δ' ἡμέραις ὕστερον ἀναβλύσαι κατ' ἄλλο στόμιον, μὴ παύεσθαι δὲ σειομένην τὴν νῆσον κατὰ μέρη, πρὶν ἢ χάσμα γῆς ἀνοιχθῆν ἐν τῷ Ληλάντῳ πεδίῳ πηδοῦ διαπύρου ποταμὸν ἐξήμεσε.

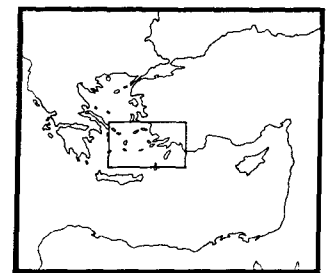
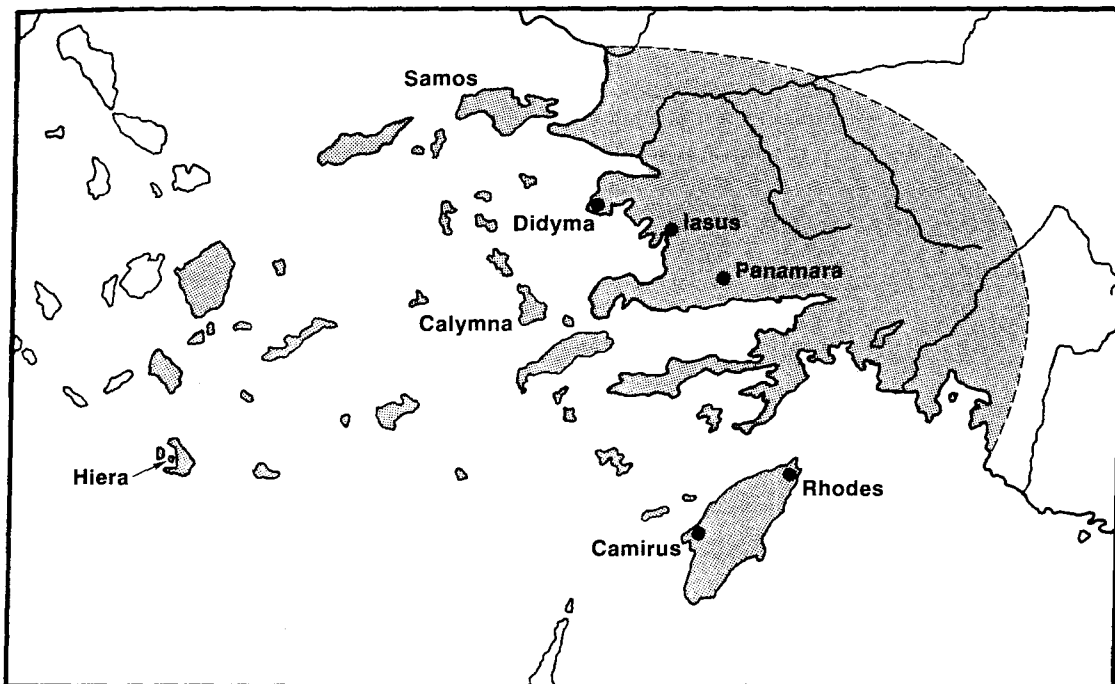
It may in fact be the same event as that recorded by Asclepiodotus, a disciple of Posidonius (see Guidoboni 1989, p.653, where the earthquake is simply described as occurring before the 1st century B.C.). Seneca refers to Asclepiodotus when mentioning an earthquake at Chalcis in central Euboea. He describes the event in very general terms, within the context of a consideration of the causes of earthquakes: "The same thing happens with air, for the stronger and more mobile it is, the more rapidly it bursts forth and the more violently it scatters anything that blocks its way. That is what causes the movement of the part of the earth under which the tension has built up. The truth of this can be shown as follows: often, when there is an earthquake, if only part of the earth is broken open, a wind blows out from there for many days, as we are told happened in the case of the earthquake which struck Chalcis. You will find this in Asclepiodotus, a pupil of Posidonius, where he too is dealing with the causes of natural phenomena. You will also find in other writers that the earth has split open in a single place and wind has blown out from there for a considerable time, so it must have made for itself a passage through which it could blow".

Idem spiritu fit, qui, quo valentior agiliorque est, citius eripitur et vehementius saep-tum omne disturbat: ex quo motus fit, scilicet eius partis sub qua pugnatum est. Quod dicitur verum esse et illo probatur: saepe, cum terrae motus fuit, si modo pars eius aliqua disrupta est, inde ventus per multos dies fluxit ut traditur factum eo motu quo Chalcis laboravit; quod apud Asclepiodotum invenies, auditorem Posidonii, in his ipsis quaestionum naturalium causis. Invenies et apud alios auctores hiasse uno loco terram et inde non exiguo tempore spirasse ventum, qui scilicet, illud iter ipse sibi fecerat per quod ferebatur.

In spite of their naturalistic treatment of events, the sources do not enable us to put an exact date on the earthquake, but, with all due caution, it is worth referring to the recent hypothesis put forward by Reinders (1992). In an excavation on the site of ancient Halus, on the Gulf of Pagasai (and therefore not far from the northern tip of Euboea), he noticed that the area of the city which he was excavating had been suddenly abandoned around 260 B.C. (though the city was not wholly abandoned, since it still survived in the 2nd century B.C.). Reinders has therefore put forward what we think is perhaps a slightly risky theory that this abandonment was caused by an earthquake. The theory is attractive but open to question, because the site has not yet been fully investigated. However, the suggested date around 260 B.C. does not clash with the literary evidence.

This area was in any case much subject to earthquakes. Thus Strabo writes (10.1.9): "The whole of Euboea is much subject to earthquakes, but particularly the part near the strait, which is also subject to subterranean blasts, as are also Boeotia and other places I have mentioned already. It is also said that the city which had the same name as the island was swallowed up in a disturbance of this kind. The city is also mentioned by Aeschylus in his *Glaucus Pontius*".

Ἔστι δὲ καὶ ἅπαντα μὲν ἡ Εὐβοία εὖσειστος, μάλιστα δ' ἡ περὶ τὸν πορθμόν, καὶ δεχομένη πνευμάτων ὑποφοράς, καθάπερ καὶ ἡ Βοιωτία καὶ ἄλλοι τόποι, περὶ ὧν ἐμνήσθημεν διὰ πλειόνων πρότερον. ὑπὸ τοιοῦδε πάθους καὶ ἡ ὁμώνυμος τῇ νήσῳ πόλις καταποθῆναι λέγεται, ἧς μέμνηται καὶ Αἰσχύλος ἐν τῷ Ποντίῳ Γλαύκῳ.



199-198 B.C.

<041> 199-198 B.C. ● Camirus, Didyma?, ● Iasus, ● Panamara, ● Rhodes, the island of Calymna, the island of Hieria, the island of Samos ▷ emergence of an island ◁

- sources Pomp. Trog. *apud* Iust. *Epit.* 30.4.1-3
- inscriptions Cousin (1904) = *IGSKl* 21.4; Segre and Pugliese Carratelli (1949-51); Habicht (1957); *IGSKl*, *Die Inschriften von Iasos* 28.1, no.4; *Inscr. Didyma* 132.1-5; *Syll.*³ 1116; *SGDI* 3609
- literature Holleaux (1904); Habicht (1960); Pugliese Carratelli (1967-68); Robert (1968, 1971, 1978); Panessa (1991); Forsyth (1992)
- catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a); Galanopoulos (1961); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

According to Justinus, who gives Pompeus Trogus as his source, an island emerged from the sea between the two islands of Thera and Therasia on the same day that a violent earthquake struck Rhodes and other cities: "That same year there was an earthquake in the midst of the sea which separates the islands of Thera and Therasia, and to the amazement of sailors, an island suddenly appeared out of the waters, which were hot. In Asia, too, on that day, the same earthquake struck Rhodes and many other cities, causing great damage, and even swallowing some cities in their entirety".

Eodem anno, inter insulas Theram et Therasiam, medio utriusque ripae maris spatio, terrae motus fuit, cum admiratione navigantium repente ex profundo cum calidis aquis insula emersit. In Asia quoque, eadem die, idem motus terrae Rhodum multasque alias civitates gravi ruinarum labe concussit, quasdam solidas absorbit.

There are various fragments of Posidonius (F 11, F 319, F 324 Theiler) which describe

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catalogue 199-198 B.C.

the spectacular volcanic eruptions leading to the emergence of the island of Hieria between Thera and Therasia. Pliny (*n.h.* 2.202, 4.70) and Plutarch (*Mor.* 399 C) also mention these phenomena, but neither of them refers to the earthquake at Rhodes. There is a substantial collection of inscriptions from Rhodes, Caria and the islands of Samos and Calymna, dating in general to the 2nd century B.C., which may refer to the earthquake mentioned by Justinus; but the fact that the inscriptions are difficult to date accurately creates problems as to which particular earthquakes are being referred to. It is not always easy to relate an inscription to this or that earthquake of thirty years or so earlier, as described by Polybius (see entry < 036 >), or perhaps to other earthquakes which are not mentioned in literary sources.

There are two inscriptions which make reference to the priest Theophanes and record earthquake effects on the island of Rhodes. In the one found at the city of Rhodes (on the right bank between the outskirts of the town and the village of Koskina (*Syll.*³ 1116), we read: "During the ministry of Theophanes, when Menecrates of Cibra was president of the association, on the twenty-sixth day of the Hyacinthian month, he and other members of the association undertook to rebuild the wall and the funerary monuments of those who died in the earthquake".

Ἐπ' ἱερέως Θεοφάνεως, ἀρχεραμιστᾶ / Μενεκράτεως Κιβυράτα, Ὑακινθίου / ἔκται ἐξ ἱκάδος, [τοῖδε] τῶν ἐραμιστῶν ἐπανγείλαντο εἰς τὸν ἀνοι/κοδομὴν τοῦ τοίχου καὶ τῶν μνα/μείων τῶν πεσόντων ἐν τῷ σεισμῷ.

In the inscription from Camirus (Segre and Pugliese Carratelli 1949-51, 110.9-12) we read: "Since the walls collapsed in an earthquake at the time of the ministry of Theophanes, and since the peripolium was not fortified, [Philocrates] undertook the rebuilding of the wall in order to complete it right to the end".

Πεπτωκό/των τε τῶν τειχέων διὰ τὸν γενόμενον σεισμὸν / ἐπ' ἱερέως Θεοφάνεως, καὶ ἀνωχύρου ὄντος τοῦ περιπολίου προενοίησε τὰς τειχοποιίας ὅπως ἐπὶ πέ/ρας συντελεσθῇ.

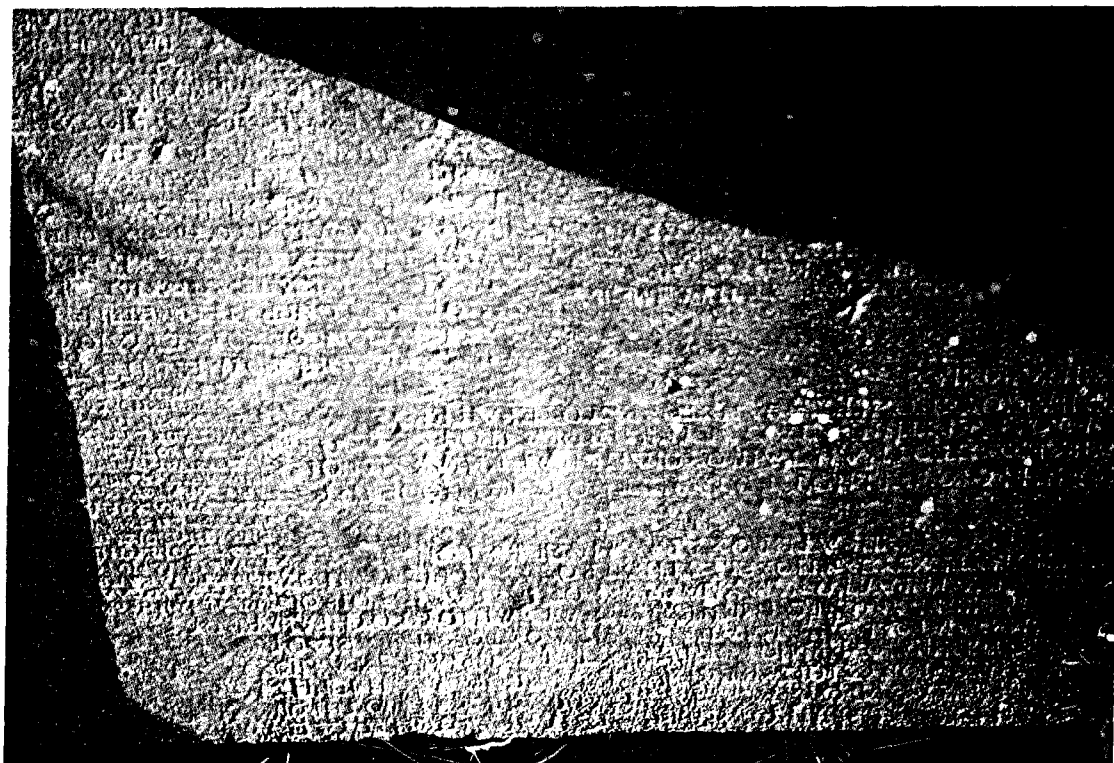
There are two other inscriptions, referring to Iasus and Panamara, which show that the earthquake probably damaged the region of Caria as well. The inscription referring to Iasus (*IGSKl*, 28.1, no.4) dates to the 2nd century B.C. It records a decree of the city in favour of Antiochus III and also gives the text of a letter from queen Laodice III, which states: "Queen Laodice greets the *Boule* and the people of Iasus. Since I have often heard from my brother of the kindness of which you are capable towards his friends and allies, and in order to restore your city, which has encountered unforeseen disasters, you are granted your liberty".

Βασιλίςσα Λαοδίκη Ἰασέων τῇ βουλῇ καὶ τῷ δή/μῳ χαίρειν. ἀκούουσα πλεονάκεις τοῦ ἀδελφοῦ ἦν / τε ἀντίληψιν τῶν ἑαυτοῦ φίλων καὶ συμμάχων / διατελεῖ ποιούμενος καὶ ὥς τὴν ὑμετέραν πό/λιν συνπτώμασιν περιπεσοῦσαν ἀπροσδοκῇ/τοῖς ἀνακτησάμενος τὴν τε ἐλευθερίαν ὑμῖν ἀπέδωκεν.

It has been supposed that the inscription is referring to earthquakes. It was first published by Pugliese Carratelli (1967-68), who related the context of the inscription to the earthquake of 227 B.C. (see entry < 036 >), identifying the queen as Laodice II. The dating was subsequently corrected by Robert (1971), who identified Laodice as Laodice III and related the inscription to the earthquake of 199-198.

The inscription from Panamara (Cousin 1904, no.3 = *IGSKl* 21.4) dates to the 2nd century B.C., and records restoration work carried out by an official of king Philip V: "Since the walls had been shaken by an earthquake, he devoted himself unremittingly to the task of repairing them, and saw to it that the work was completed".

Συνσεισθ[ε]ν/των τῶν τειχέων ὑπὸ τοῦ / σεισμοῦ, ἐκτενῇ παρέχων αὐ/τόν, ἐπεσκεύασεν πάντα.



2nd century B.C. Greek inscription: reference is made to damage suffered by the city of Iasus (Caria) – very probably in the earthquake

of 199-198 B.C. Inscription collection of the Missione Archeologica Italiana at Iasus, Kiyikliçlacik Köyü, Milas, Turkey.

Another inscription (Habicht 1957, no.64, 18-22) records the generous work of a doctor when an earthquake struck the Aegean island of Samos: “[The doctor Diodorus] during earthquakes which occurred on our island, and since many had suffered injuries of all kinds and rapid action was necessary because of the extraordinary nature of the event, worked unstintingly on behalf of all and sundry”.

Ἐν τε τοῖς [γε]νομένοις σεισμοῖς πα/ρ' ἡμῖν πολλῶν περιπεσόντων δυσχέρειν καὶ παντο/[δ]απαῖς πληγαῖς διὰ τὸ παράδοξον τοῦ συμπτώματος / [πρ]οσδεομένης ὀξείας τῆς [θερ]απείας ὁμοίως πάσιν / [τ]ὴν αὐτοῦ χρεῖαν μερίζων ἐ[βο]ήθησεν.

The dating of this inscription varies between 201 and 197 B.C., and it may perhaps be referring to an earthquake which occurred shortly before the one at Rhodes in 199-198 (for the differing interpretations provided by scholars, see Robert 1978, pp.406-7).

There is a fragmentary inscription (SGDI 3609), found near the temple of Apollo at Calymna and dating to the 2nd century B.C., which mentions earthquakes on the island: “In the Carnean month [August-September]. Earthquakes occurred continually in the island, placing us in danger [---] embassy [---]”.

Μηνὸς καρνείου. / [γε]γεννημένων συνεχῶν σεισμῶν ἐ/[ν] τᾷ νάσῳ, δι' ὧν ἀμῶν κινδυνευόν/[των] ---πρ[ε]σβευτὰν ΘΕ [---].

The memory of earthquakes in Caria seems to account for votive offerings such as that referred to in an inscription from the sanctuary of Didyma near Miletus (*Inscr. Didyma* 132.1-5), which mentions the fear aroused in the populace when an earthquake struck nearby cities. The inscription dates to the last quarter of the 2nd century B.C. (previously, in Guidoboni 1989, p.654, we went as far as to suggest that an earthquake had occurred at about that date; and our hypothesis still has some

weight), and contains the text of an oracle relating to the cult of Poseidon, found on an altar dedicated to him, and made by Andronicus, who was treasurer and supervisor of the building of the temple of Apollo at Didyma, not far from Miletus: "The god has spoken: petition Poseidon Asphalios with sacrifices in this sign, and pray to him to come propitiously and to preserve the appearance of your city, without tremors and without danger".

Θεὸς ἔχρησεν / Ἀσφάλειον θυσίαισι Ποσειδάωνα ἱλάσασθε / τῷδε ἐπὶ σημείῳ καὶ αἰτεῖσθ' ἱλαὸν ἰκνεῖσθαι / σώζειν θ' ὑμετέρης κόσμον πόλεως ἀσάλευτον / ἐκτὸς κινδύνου.

Since Poseidon is given the epithet *Asphalios*, the feared danger from which protection is sought must be an earthquake. As Robert (1968, p.577) points out, earthquakes aroused anxiety in areas close to the area of damage, probably because of a fear of further tremors.

<042> **shortly after 15 March 193 B.C. Italy**

sources Liv. 34.55.1-4

catalogues Manetti [1457]; Filippo da Secinara (1652); Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Mercalli (1883); Baratta (1899); Galli (1906); Guidoboni (1989)

According to Livy, there was a whole succession of earthquakes in 193 B.C.: "At the beginning of the year when L.Cornelius and Q.Minucius were consuls, earthquakes were reported with such frequency that people grew weary not only at the news itself but also at the religious ceremonies which were prescribed on that account; for senate meetings could not be held nor public administration carried on, because the consuls were busy with sacrifices and expiatory ceremonies. Finally the decemvirs were ordered to consult their books, and prayers were said for three days, as their response required. Men wearing garlands on their heads prayed at all the couches of the gods, and all members of a single family were ordered to pray together. Also, on the instructions of the senate, the consuls ordered that no-one should report an earthquake on a day when religious ceremonies were to take place in relation to another earthquake which had already been reported".

Principio anni quo L.Cornelius Q.Minucius consules fuerunt, terrae motus ita crebri nuntiabantur ut non rei tantum ipsius sed feriarum quoque ob id indictarum homines taederet; nam neque senatus haberi neque res publica administrari poterat sacrificando expiandoque occupatis consulibus. Postremo decemviris adire libros iussis, ex responso eorum supplicatio per triduum fuit. Coronati ad omnia pulvinaria supplicaverunt, edictumque est ut omnes qui ex una familia essent supplicarent pariter. Item ex auctoritate senatus consules edixerunt ne quis, quo die terrae motu nuntiato feriae indictae essent, eo die alium terrae motum nuntiaret.

Livy does not indicate where the earthquakes occurred, but simply records that reports of earthquakes were continually reaching Rome, and that the normal expiatory religious ceremonies were held there. So serious was the situation that it was impossible to follow normal practice for *procuratio prodigiorum*. From Livy's account itself, and from the calm reaction of the populace as recorded by him, it would seem that the earthquakes were not felt in Rome. At that period, Roman rule extended roughly from the river Po to Sicily (including the islands in the Tyrrhenian Sea); but we have no geographical references which might allow us to establish where this long series of earthquakes took place.

From 222 to 153 B.C., the consuls took office on 15 March, and from 153 B.C. onwards on 1 January.

<043> 192 B.C. Rome

sources Liv. 35.40.7

literature Coarelli (1988); Molin and Guidoboni (1989)

catalogues Manetti [1457]; Ligorio [1574-7]; Filippo da Secinara (1652); Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Mercalli (1883); Baratta (1899); Galli (1906); Guidoboni (1989)

In 192 B.C. earthquake tremors shook Rome for thirty-eight days; but apart from alarm, Livy records no other effects. As far as Rome was concerned, in fact, the earthquake was recorded by Livy as of less consequence than a fire which raged in the Forum Boarium: "Two very alarming events took place in Rome in the same period: one lasted longer but was less destructive: the earth shook for thirty-eight days. Hence that number of days was spent as a holiday in apprehension and fear; and the occurrence caused a three-day period of prayer to be held".

Romae per idem tempus duo maximi fuerunt terrores, diutinus alter, sed segnior: terra dies duodequadraginta movit; per totidem dies feriae in sollicitudine ac metu fuere tri-duum eius rei causa supplicatio habita est.

Livy specifically describes the terrified reaction of the populace as "groundless alarm", but makes it clear that the fire in the Forum Boarium had terrible consequences for both people and buildings (see Coarelli 1988 for subsequent building activity). City life was brought to a halt throughout the period when the tremors were felt, so that the expiatory ceremonies ordered by the magistrates could be carried out — including, as Livy specifies, three days of communal prayer.

It is interesting to compare what happened on this occasion with the preceding earthquakes of 193 B.C. (see entry <042>). In the later case, the interruption to public administration did not arouse resentment in the populace, because they could feel the tremors. Since there is no mention of specific damage in Rome itself, it may be that the epicentre of the earthquake was either in the central Apennines (perhaps in the region of L'Aquila or Rieti) or else in the Alban Hills, since that area was known for periods of seismic activity which could be felt in Rome but were not of great intensity.

<044> September 179 B.C. Rome

sources 1 Liv. 40.59.7-8

sources 2 Obseq. 7

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Nissen (1883); Galli (1906); Guidoboni (1989)

Livy includes an earthquake amongst some prodigies which caused the Romans to revive the annual September *ludi*. The tremors caused movements of the heads of statues set out on couches for the *lectisternium*: "The earth shook; and in public temples where there was a *lectisternium* the heads of the gods on the couches turned away, and the covered dish which had been placed before Jupiter fell from the table".

Terra movit; in fanis publicis, ubi lectisternium erat, deorum capita quae in lectis erant averterunt se, lanxque cum integumentis quae Iovi apposita fuit decedit de mensa.

Obsequens' report derives from Livy: "during the *lectisternium* for Jupiter, an earthquake caused the heads of the gods to turn".

In lectisternio Iovis terrae motu deorum capita se converterunt.

As in the case of the 192 B.C. earthquake (see entry <043>), it seems likely that the epicentre was a long way from Rome, but that tremors were felt there.

〈045〉 **towards the end of 174 B.C. • Sabina**

sources Liv. 41.28.1-2

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Mercalli (1883); Guidoboni (1989)

According to Livy, news reached Rome towards the end of 174 B.C. that an earthquake had occurred in Sabine territory, causing many buildings to collapse. Consequently, a *supplicatio* was held for a whole day at the temple of Ceres, Liber and Libera on the Aventine: "At about the end of the year [...]. A second day of prayer to Ceres, Liber and Libera was also held, because it was reported from Sabine territory that a great earthquake had occurred and many buildings had collapsed".

Exitu prope anni diem [...]. Et alterum diem supplicatio ad Cereris, Liberi Liberaeque fuit, quod ex Sabinis terrae motus ingens cum multis aedificiorum ruinis nuntiatus erat.

〈046〉 **the afternoon of 21 February 148 [or 130?] B.C. • Antioch**

sources Domn. *apud* Mal. 207-8

literature Förster (1902); Downey (1938 a, 1961)

catalogues Sieberg (1932 a); Guidoboni (1989)

Malalas tells us what the historian Domninus has to say about a serious earthquake at Antioch: "After Demetrianus, Antiochus, grandson of Grypus and son of Laodice, daughter of Ariarathes, emperor of the Cappadocians, reigned for eleven years. In the eighth year of his reign, in the time of the Macedonians, 152 years after the original laying of the foundation of the walls by Seleucus Nicator, at the tenth hour of the day, on 21 Peritius / February, Antioch suffered from the wrath of God. It was completely rebuilt and improved, as Domninus the historian has written, having suffered 122 years after the completion of the walls and the whole city".

Μετὰ δὲ Δημητρίανδον ἐγένετο βασιλεὺς Ἀντίοχος ὁ ἔκγονος τοῦ Γρύπου, υἱὸς Λαοδίκης, θυγατρὸς Ἀριαράθου, βασιλέως Καππαδόκων, ἔτη θ'. καὶ ἔπαθε τότε ὑπὸ θεομηνίας Ἀντιόχεια ἡ μεγάλη τῷ ὀγδόῳ ἔτει τῆς βασιλείας αὐτοῦ ἐπὶ τῶν αὐτῶν Μακεδόνων, μετὰ τὸ ἐξ ἀρχῆς τεθῆναι θεμέλιον τείχους ὑπὸ Σελεύκου τοῦ Νικάτορος μετὰ ἄλλα ἔτη ρνβ'. ὥραν ἡμερινὴν ι', μηνὶ περιτίῳ τῷ καὶ φεβρουαρίῳ κα'. καὶ ἀνενεώθη πᾶσα, καθὼς Δόμνος ὁ χρονογράφος συνεγράψατο· μετὰ δὲ τὸ πληρωθῆναι τὰ τεῖχη καὶ τὴν πόλιν πᾶσαν μετὰ ρκβ' ἔτη ἔπαθε· καὶ βελτίων ἐγένετο.

On this occasion, Malalas' chronology is confused (see Downey 1938 a, p.120). He may have got the date wrong through his tendency to "number" the principal earthquakes at Antioch (on this point, see Förster 1902; see also Downey 1938 a, p.110). Downey shows that the figure of 122 years contradicts the known historical facts in that it would give a date of 130 B.C. for the earthquake (Downey 1961, p.126, note 32). It is not easy to establish the date of the earthquake, and it is even theoretically possible that there were two separate ones.

〈047〉 **133 B.C. Luna ▷subsidence◁**

sources Obseq. 27 a

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Mercalli (1883); Guidoboni (1989)

As in the case of other seismic events recorded in Italy for the 2nd and 1st century B.C., and for which we lack evidence from Livy, the source is a late one (4th century A.D.?).

However, there is no doubt about Julius Obsequens' reliability.

Obsequens reports land subsidence at Luna (now Luni, in southern Liguria). There is nothing in his text to suggest that the phenomenon was or was not the result of an earthquake: "The land at Luni sank over an area of 4 *iugeri* (c.10,000 sq.m) and the cavity soon became a lake".

Lunae terra quattuor iugerum spatio in profundum abiit et mox de caverna lacum reddidit.

<048> 126 B.C. the Etna area, the Aeolian islands

▷emergence of an island, eruption of Etna◁

sources 1 Plin. *n.h.* 2.203; Eus. *Hieron. Chron.* 146; Obseq. 29; Oros. *Hist.* 5.10.11

sources 2 Land. Sagax *Hist. Rom.* 1.104

literature Berti (1989)

catalogues Bonito (1691); Mongitore (1743); von Hoff (1840); Mercalli (1883); Guidoboni (1989)

Only very late sources, such as Obsequens and Orosius, record this earthquake and the eruption of Etna which followed it.

According to Obsequens, Etna was shaken by an earthquake tremor and there was a powerful eruption: "As a result of an earthquake, Mt.Etna spread flames far and wide from its peak. The sea boiled at the Lipari islands, where ships were burned and many sailors killed by the heat. A large quantity of dead fish were scattered around, which the people of Lipari eagerly took to eat, but they died of gastric poisoning, and so the islands were devastated by this strange pestilence".

Aetna mons terrae motu ignes super verticem late diffudit, et ad insulas Liparas mare efferbuit et quibusdam adustis navibus vapore plerosque navalis exanimavit, piscium vim magnam exanimem dispersit, quos Liparenses avidius epulis appetentes contaminatione ventris consumpti, ita ut nova pestilentia vastarentur insulae.

The same event is recorded by Orosius:

"During the consulship of M.Aemilius and L.Orestes, Mt.Etna was shaken by a great tremor and balls of fire flowed out of it, and again, on another day, the island of Lipara and the sea nearby around it boiled so much that the heat burned and dissolved the rocks, scorched the planks of the ships after melting the binding wax, killed and boiled the fish as they swam near the surface, and also suffocated people, except for those who were able to flee some distance; but by constantly breathing hot air, they burned their inner organs".

M.Aemilio L.Oreste consulibus Aetna vasto tremore concussa exundavit igneis globis, rursusque alio die Lipara insula et vicinum circa eam mare in tantum efferbuit, ut adustas quoque rupes dissolverit, tabulata navium liquefactis ceris extorruerit, exanimatos pisces supernatantesque excoxerit, homines quoque, nisi qui longius potuere diffugere, reciprocatu anhelitu calidi aeris adustis introrsum vitalibus suffocarit.

The historical background to this earthquake has been studied by Berti (1989, pp.96-7), who also mentions the subsequent eruption of 122 B.C.

In the section on earthquakes in his *Naturalis Historia*, Pliny records for that year only the emergence of an island in the *Sinus Tuscus* (Tyrrhenian sea): "Before our time also among the Aeolian Islands near Italy, as well as near Crete, there emerged from the sea an island 2500 paces long, with hot springs, and another in the third year of the one hundred and sixty-third Olympiad, in the Tyrrhenian Sea, burning hot and with a violent blast of air; and tradition has it that a great quantity of fish were floating round it, and that those who ate any died at once".

Ante nos et iuxta Italiam inter Aeolias insulas, item iuxta Cretam emersit MMD passuum una cum calidis fontibus, altera Olympiadis CLXIII anno tertio in Tusco sinu, flagrans haec violento cum flatu: proditurque memoriae magna circa eam multitudine piscium fluitante confestim expirasse quibus ex his cibis fuisset.

In the *Chronicon* of Eusebius, an island is recorded as having emerged in the Aeolian archipelago at the southern end of the Tyrrhenian Sea: "In the Aeolian islands flames came out of a great wind and an island appeared which is now called Hiera".

Iuxta Aeoli insulas igne ex flatu suscitato apparuit insula, quae nunc Hiera vocatur.

< 049 > 118 B.C. Rome?

sources Obseq. 35

catalogues Bonito (1691); von Hoff (1840); Galli (1906); Guidoboni (1989)

As in the case of other seismic events recorded in Italy for the 2nd and 1st century B.C., and for which we lack evidence from Livy, the source is a late one (4th century A.D.). However, there is no doubt about Julius Obsequens' reliability.

In the year 118 B.C., according to Obsequens, "The earth shook and gave a bellow".

Terra cum mugitu tremuit.

It is not possible to establish a location from the context, though it may well be that the earthquake occurred at Rome, where other series of prodigies are located by Livy and, after him, by Obsequens.

< 050 > 117 / 113 B.C. O Privernum, Apulia, O Lucania > subsidence <

sources Cic. *De div.* 1.43.97; Obseq. 36, 38

literature Wülker (1903); Pease (1920-23); MacBain (1982)

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Mercalli (1883); Galli (1906); Guidoboni (1989)

Cicero, who wrote a somewhat polemical treatise *On divination*, refers to some prodigies about which he probably learned from official senate documents. In one passage he records that severe earthquakes struck Apulia towards the end of the 2nd century B.C.: "Again, when a report was made to the senate of a landslide in the country near Privernum, in which the land collapsed to a great depth, and when Apulia was shaken by violent earthquakes: these were all portents to the Roman people of great wars and damaging revolts".

Delata etiam ad senatum labe agri Privernatis, cum ad infinitam altitudinem terra desedisset Apuliaque maximis terrae motibus conquassata esset — quibus portentis magna populo Romano bella perniciosaeque seditiones denuntiabantur.

The event may be linked to evidence from Obsequens — a later source, but one who also relies on Livy or other annalists. According to him (36): "At Privernum the earth subsided into a cavity covering an area of 7 iugeri (c.17,500 sq.m)".

Priverni terra septem iugerum spatio in caverna desedit.

In Roman times, the centre of Privernum was situated about 1 km to the north of present-day Priverno (southern Latium). Obsequens' work is confused at this point: perhaps as the result of an oversight on his part, the consuls mentioned at the beginning of the paragraph are those who in fact held office in 119 B.C. In another passage

(38), he records a similar natural phenomenon for the year 113 B.C.: "At Privernum and in Lucania a great cavity appeared in the earth".

Terra in Lucanis et Privernati late hiavit.

The distance between Privernum, Lucania and Apulia is such as to suggest that these are distinct phenomena (earthquakes and other geomorphological disturbances) which have been brought together by Cicero either for rhetorical purposes or in order to adhere to the usual conventions in lists of prodigies.

Wülker (1903, p.18) dates these earthquakes to 117 B.C., and MacBain takes up this dating (1982, p.87). Pease (1920-23, p.153, note 1), uses the passage from Obsequens 38 to give 113 B.C. as the probable date for the earthquakes mentioned in Cicero's text.

<051> 100 B.C. ● Picenum

sources Obseq. 45

literature Traina (1985); Adam (1989 a); Traina (1994 a)

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Mercalli (1883); Guidoboni (1989)

As in the case of other seismic events recorded in Italy for the 2nd and 1st century B.C., and for which we lack evidence from Livy, the source is a late one (4th century A.D.?). However, there is no doubt about Julius Obsequens' reliability.

Obsequens records that in the year 100 B.C.: "an earthquake caused houses to collapse in ruins in Picenum, while in some cases the shaking of the foundations left them standing but leaning at an angle".

In Piceno terrae motu domicilia ruinis prostrata, quaedam convulsa sede sua inclinata manserunt.

The fact that *domicilia* are mentioned as having been destroyed in the earthquake suggests a rural or semi-rural setting, for there is no reference to public buildings or fortifications. It is worth pausing to pay some attention to what Obsequens reports, even though he does so in epitomic form. In this instance, the prodigious nature of the event lay not so much in the collapses as in the fact that some houses remained standing at an angle, even though their foundations had been undermined by the earth movements. There is nothing surprising about this, for the ancients saw earthquakes as an unavoidable aspect of life (Traina 1985), and hence not all seismic disasters were necessarily regarded as prodigious. And we must not forget that whenever an occurrence was regarded as prodigious, an appropriate expiatory ceremony had to be carried out. The fact that an earthquake occurred — not an unusual event in Italy — was not sufficient in itself: it had to have qualities which rendered it "abnormal".

How serious a *portentum* was reckoned to be depended largely on the intensity of the anxiety it aroused; and it certainly must have been stressful to see houses which had been so shaken to their foundations that they were leaning without actually having collapsed. To the ancient imagination, the sight of these houses somewhere between their normal position and a state of collapse must have seemed the realisation of the impossible, and therefore far more striking than a simple collapse.

A house leaning at an angle was, so to speak, a realisation of the earthquake imagery of ancient art, where houses were shown at the moment of collapse. One example is the famous relief in the House of L. Caecilius Jucundus at Pompeii, where buildings are seen collapsing in the forum, and another — also from Pompeii — shows the *castellum aquae* area (Adam 1989 a, pp.168-71). The buildings in these reliefs are shown leaning at an angle, not in order to provide a realistic representation or evocation of their collapse, but because it was no easy matter to convey in relief and without ambiguity the idea of collapses taking place.

However, while a phenomenon of this kind could not occur at Pompeii in 62 A.D. because of the solidity of the surface stratum of lava, it did happen sometimes in this area of Picenum; and the sight, in real life, of such a "symbolic form" was bound to acquire the special force of a prodigy. Given Obsequens' criteria of selection, therefore, it is not necessary to suppose that the earthquake did not occur in an urban area. It was very unusual for sources to mention earthquakes in country areas, unless they were accompanied by striking geological phenomena; for the only items of interest to an annalist were occurrences which could be effectively considered as *prodigia*. Consequently, even the death and damage caused by a destructive earthquake were of less moment than the stress caused by seeing houses leaning at an angle (Traina 1994 a).

<052> 99 B.C. ●Nursia, Rome

sources Gell. 4.6.1-2; Obseq. 46

catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Mercalli (1883); Galli (1906); Guidoboni (1989)

The sources for this earthquake are post-2nd century A.D., but they nevertheless deserve serious consideration, because they draw on reliable sources themselves, and perhaps even on archive documents.

According to Aulus Gellius, who got his information from a decree of the senate, it was reported in 99 B.C. that the earth had shaken and that in Rome the spears of Mars in the *Regia* had moved: "Not only was it normal practice for earthquakes to be reported, and expiatory offerings to be made, but I also find it mentioned in early records, that report was made to the senate if the spears of Mars moved in the sanctuary in the *Regia*. On one such occasion, during the consulship of Marcus Antonius and Aulus Postumius, a decree of the senate was issued, of which this is a copy: 'Whereas Gaius Julius, son of Lucius, the pontifex, has reported that the spears of Mars have moved in the sanctuary in the *Regia*, the senate has therefore decreed that Marcus Antonius the consul shall arrange a sacrifice of fully-grown victims to Jupiter and Mars, and of unweaned victims to such of the other gods as he thinks fit. If he arranged these sacrifices, that, they thought, would be sufficient. If, however, there was a need for additional victims, they should have red fur'".

Ut "terra movisse" nuntiari solet eaque res procuratur, ita in veteribus memoriis scriptum legimus nunzium esse senatui in sacrario in regia "hastas Martias movisse". Eius rei causa senatusconsultum factum est M. Antonio A. Postumio consulibus, eiusque exemplum hoc est: "Quod C. Iulius, L. filius, pontifex, nuntiavit in sacrario in regia hastas Martias movisse, de ea re ita censuerunt, uti M. Antonius consul hostiis maioribus Iovi et Marti procuraret et ceteris dis, quibus videretur, lactantibus. <Ibus> uti procurasset satis habendum censuerunt. Si quid succidaneis opus esset, robiis succideret".

These shocks felt in Rome can be identified as deriving from an earthquake which occurred in Nursia (now Norcia, Umbria) in the same year and is recorded by Obsequens: "A sacred temple at Nursia was destroyed in an earthquake".

Nursiae aedes sacra terrae motu disiecta.

<053> 97 B.C. Pisaurum

sources Obseq. 48

literature Traina (1994 a)

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Mercalli (1883); Guidoboni (1989)

As in the case of other seismic events recorded in Italy for the 2nd and 1st century B.C., and for which we lack evidence from Livy, the source is a late one (4th century A.D.). However, there is no doubt about Julius Obsequens' reliability. In 97 B.C., according to Obsequens, "A rumbling of the earth was heard at Pisaurum, and in many places the top part of the walls collapsed without an earthquake, this being a portent of civil discord".

Pisauri terrae fremitus auditus. Muri pinnae sine terrae motu passim deiectae civiles portendere discordias.

Pisaurum is now Pesaro in the Marche. Here we have an example of how a minor seismic event could be considered a prodigy, even though it was not taken as a real earthquake. The term *fremitus* is perhaps used here to describe the sound produced by a local, low-intensity earth tremor; nevertheless, the original prodigy list which was the basis of the tradition preferred to imagine that the top of the walls had collapsed "spontaneously", rather as happened in the case of the spears of Mars in the *Regia*. This is further evidence that, in classical antiquity, the prodigious quality of an earthquake lay not so much in its destructiveness as in certain particular effects which, however marginal in reality, were particularly spectacular and unforeseen. On the one hand, the ancients adopted a fatalistic attitude towards earthquakes and the destruction they caused, but they were also struck with sudden anxiety if a collapse or earth movement seemed to be spontaneous, or if a building was left leaning at an angle. And such attitudes were naturally intensified at times of serious political and social unrest (Traina 1994 a).

<054> 92 B.C. **Faesulae**

sources Obseq. 53

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Mercalli (1883); Guidoboni (1989)

As in the case of other seismic events recorded in Italy for the 2nd and 1st century B.C., and for which we lack evidence from Livy, the source is a late one (4th century A.D.). However, there is no doubt about Julius Obsequens' reliability. Obsequens records that: "a rumbling of the earth was heard at Faesulae".

Faesulis fremitus terrae auditus.

The Etruscan city of *Faesulae* (now Fiesole, north of Florence) was deeply involved in the war between Rome and its allies. Many *prodigia* – such as this minor seismic event – were recorded for Faesulae in the 90s, and they reflect the attention paid by Rome to that city shortly before the war.

<055> **shortly before 91 B.C. ● Reggio Calabria?**

sources Strabo 6.1.6

literature MacBain (1982); Costamagna (1987); Spadea (1987); Musti (1988)

catalogues Bonito (1691); von Hoff (1840)

At the end of a passage about Reggio Calabria, Strabo records that: "Shortly before the Marsian War [the Social War of 91-89 B.C.], much of the settlement was reduced to ruins by earthquakes".

μικρὸν δὲ πρὸ τῶν Μαρσικῶν καὶ σεισμοὶ κατήρειψαν πολὺ τῆς κατοικίας.

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catalogue 99-91 B.C.

If we take what Strabo says literally, and relate it to the context in which he places it, we must inevitably associate it with the evidence provided by Obsequens (54). But it is difficult to know whether the Reggio referred to by Obsequens at the year 91 (see entry <056>) is Reggio Emilia or Reggio Calabria. Neither town was a Roman colony at the time, Reggio Calabria being a federate city and Reggio Emilia simply a *forum*, and hence neither was of any particular importance when it came to listing prodigies. The distribution of prodigies in federate areas (and, in some cases, extra-Italic areas) has been studied by MacBain (1982, pp.107ff.), who shows that they generally tended to be reported in areas under the direct control of the Romans. Thus there is only one prodigy attested in Calabria, and that without any indication of its provenance (*ex Bruttis*, 199 B.C., Liv. 32.1.11), whereas the Po valley provides examples from Bononia, Mantua and Mutina. It therefore seems sensible to relate this earthquake to the Po valley (see entry <056>).

Nor is the fact that Obsequens uses the term *urbs* sufficient to make us believe he is referring to Reggio Calabria; for however authoritative Strabo's evidence may be, we must keep in mind that his source may be the same as that of Obsequens, who simply refers to *Regium* (MacBain 1982, p.109, tentatively decides on Reggio Emilia).

We still have to assess the import of Strabo's remarks, however. They occur in a context which is undoubtedly Calabrian, but we also note that this is an isolated piece of information, produced when Strabo is gathering together a number of pieces of historical evidence in order to account for the gradual depopulation of cities. Though Strabo is famous for his geographical work, he also wrote a historical work, now lost, and must have made use of a number of different Greek and Latin authors (his passage about Reggio includes a consideration of a Latin etymology for the city's name — from *regium* "royal", see Musti 1988, pp.66 and 263-4). We therefore cannot exclude the possibility that his attribution to Calabria of the information about Reggio is the result of a mistake on his part, resulting from his using a Latin source which, as was usual, simply listed prodigies on a year-by-year basis.

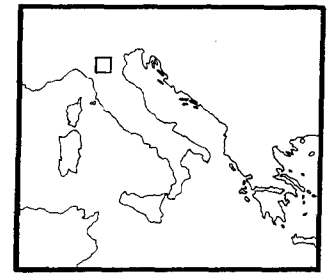
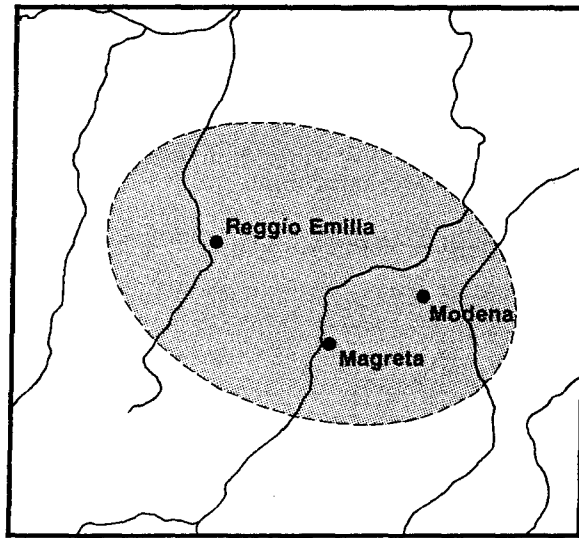
Since Strabo describes Reggio Emilia as Ῥήγιον Λεπίδου, it is quite possible that he took the simple "Reggio" of his source to refer to Reggio Calabria. It is indeed the case that Livy (who was Obsequens' principal source) simply refers to Reggio Calabria as *Regium*, which must have been the usual practice; and Reggio Calabria was indeed a much more important place than Reggio Emilia.

For that very reason, however, we must avoid the *lectio facilior* argument and settle for leaving the evidence as uncertain. Strabo may have taken his information from the same or a similar author to that used by Obsequens, who was consulting a prodigy list. Thus his clear attribution of the earthquake to Reggio Calabria may have resulted from the fact that his passage on that city comes out of a digression on earthquakes; and he thinks that the name "Reggio" derives from the verb ῥήγνυμι, "I break", this being an allusion to the break which created the Strait. At the same time, what Pliny has to say about Modena (see entry <056>) gives us both a chronological and geographical basis for attributing seismic phenomena to the Modena and Reggio Emilia area, leaving the evidence provided by Strabo and Obsequens in isolation. In any case, our knowledge of Reggio Calabria and its territory in Roman times (see the review in Costamagna 1987 and Spadea 1987) is still too poor to provide evidence for or against Strabo's report.

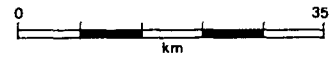
<056> 91 B.C. **Campi Macri?** [perhaps Magreta], ● the Modena area,
● Reggio Emilia ▷ eruption of mud volcanoes ◁

sources Plin. *n.h.* 2.199; Obseq. 54

inscriptions CIL 10.1401 = ILS 6043



91 B.C.



- literature Münzer (1897); Stoppani (1908); Pantanelli (1910); De Buoi (1937); Bodvarsson (1970); Köves-Zulauf (1971); Sabbattini (1972); Tamrazyan (1972); Higgins and Saunders (1974); MacBain (1982); Snjukov *et al.* (1986); Valvo (1989); Sordi (1989 b); Martinelli (1989, 1993); Nikolaevskii (1993)
- catalogues Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Mercalli (1883); Guidoboni (1989)

There is a passage in the *Naturalis Historia* in which Pliny describes a very extensive earthquake which was witnessed by some Roman knights and their retinue as well as by some travellers, and which affected the whole area around the Via Emilia, probably causing damage to various towns and villages: "I find in the texts of Etruscan lore that there once occurred a great and portentous earthquake in the country near Mutina during the consulship of L. Marcius and Sextus Julius. For two mountains crashed together with a thunderous noise and then jumped backwards and forwards, and in broad daylight flames and smoke rose into the sky from between them, as witnessed from the Via Emilia by a great number of Roman knights and their retinues and some travellers. The shock crushed all farm buildings, and the many animals inside were killed. This was in the year before the Social War, which I consider to have been more damaging to Italy than the civil wars themselves".

Factum est semel, quod equidem in Etruscae disciplinae voluminibus invenio, ingens terrarum portentum L. Marcio Sexto Iulio coss. in agro Mutinensi. Namque montes duo inter se concurrerunt crepitu maximo adsultantes recedentesque, inter eos flamma fumoque in caelum exeunte interdiu, spectante e via Aemilia magna equitum Romanorum familiarumque et viatorum multitudine. Eo concursu villae omnes elisae, animalia permulta quae intra fuerant, exanimata sunt, anno ante sociale bellum quod haud scio an funestius terrae ipsi Italiae fuerit quam bella civilia.

Pliny's reference to *villae* — typical Roman farms — suggests that the effects of the earthquake were principally felt in the country. One of the most widely accepted hypotheses (Münzer 1897), suggests that Pliny's principal source, at least for prodigies (a category which includes earthquakes), was Varro, whose own sources were apparently Coelius Antipater, Sisenna and Silla. And another source used by Varro — and later Pliny — was Q. Valerius Soranus. The latter was active in the ranks of the popular party during the first civil war, and Pompey therefore had him executed in Sicily. But he was alive at the time of this earthquake. Soranus is considered to be the first encyclopaedist in Roman literature (Köves-Zulauf 1971), and was therefore likely to be

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interested in the dynamics of natural phenomena. His work, entitled *Epoptides*, is apparently esoteric in tendency and theosophic in structure, so that any analysis of his was likely to have even more pronounced mystical overtones than usual. Obsequens seems to be referring to the same 91 B.C. earthquake in his *Liber prodigiorum*. For that particular year he writes: "an earthquake near Reggio destroyed part of the city and its walls".

Circa Regium terrae motu pars urbis murique diruta.

Obsequens is almost certainly referring to the same earthquake as Pliny, and the city mentioned is *Regium*, i.e. *Regium Lepidi* [Reggio Emilia], which is not far from the *Mutina* [Modena] area, where Pliny locates the earthquake. The identification of Obsequens' *Regium* as Reggio Emilia is normally accepted by current scholarship (for a recent study, see Valvo 1989, p.119 and note 8). However, Strabo's report of an earthquake at Reggio Calabria (see entry (055)) is quite puzzling. It must be said that the year 91 B.C. was a year of extreme instability for Rome, involved as it was in the Social War. *Prodigia* were frequent: the same entry in Obsequens also mentions a flash of fire "rising from the ground" at *Aenaria*, now the island of Ischia. Some editors correct the place-name to *Aesernia*, now Isernia in Samnium. This view is shared by Sordi (1989 b, pp.127-9), who considers the event to have been a "seismic flash". We prefer not to accept Obsequens' report (whether of an event at *Aenaria* or *Aesernia*), for we think it likely that the event referred to was a landslide.

A comparison of the two accounts makes it clear, however, that although Pliny and Obsequens have in common their supernatural interpretation of events, they were using sources which looked at the earthquake from different viewpoints. Pliny tells us that he learned of this earthquake in the *ager Mutinensis* (the countryside around Modena) from Etruscan works on haruspicy, and then he seems to link it with the subsequent beginning of the Social War.

It has been suggested (MacBain 1982) that Pliny was alluding to *ostentaria*, which were lists of prodigies (including earthquakes) drawn up by the *haruspices*, who used them as reference books for their work. These "private" lists existed alongside official archive records, and so the existence of two different kinds of source may explain the discrepancies between the two versions which have come down to us.

The earthquake may have been recorded not only in Rome but also, in its local aspects, in the archives of individual towns in Cisalpine Gaul; and one of these archives — namely that of *Regium [Lepidi]* — may be the original source of Obsequens' account.

Sabattini (1972) has suggested that this earthquake was an early — though not the principal — cause of the abandonment of what are known as the *Campi Macri*. This is a place between Parma and Reggio Emilia which can perhaps be identified as modern Magreta. A large country market of pre-Roman origin was held there, dealing particularly in sheep. It was one of the places where the plain dwellers and the mountain people of the Apennines congregated, and at the time of its greatest prosperity it gradually acquired permanent buildings.

There is an early imperial inscription (*CIL* 10.1401 = *ILS* 6043) — it can in fact be dated to 56 A.D. — which describes the *Campi Macri* as an already abandoned place with derelict buildings, where no-one wished to live any more: "In the Modena area there is a place called *Campi Macri*, where a market used to be held, but it has been abandoned for a number of years".

In regione Muliniensi [sic], qui vocarentur Campi Macri, in quibus loci mercatus agi superioribus solitus esset temporibus, iam per aliquod annos desisset haberi.

The principal reason for the complete abandonment of the *Campi Macri* certainly lies in a gradual shifting of the main commercial routes which had long given the area a



Regnano (Reggio Emilia): mud volcanoes several metres high. There is historical evidence for their eruptions from the end of the 16th century onwards (photo G.Martinelli).

privileged position in relation to other parts of Cisalpine Gaul (e.g. Cremona, which had an important market in early imperial times).

As for scientific investigations of the phenomena described by Pliny, there have been a number of studies by earth science scholars, especially those interested in volcanic mud eruptions, which are generally related to deposits of hydrocarbons and salt water. Although these are cold eruptions, they take place because of the particular dynamics of the fluids inside the volcanoes. As recent studies have confirmed (Higgins and Saunders 1974; Snjukov *et al.* 1986), these fluids react to perturbations of the earth's crust which occur before, during and after seismic activity. There have also been studies (see Martinelli 1989, 1993) on their possible use as natural indicators of impending seismic events.

In view of the above, it is obvious that Pliny's reference to an eruption in the Reggio-Modena area is of particular interest because of the existence, even now, of many mud volcanoes, including, for example, the one at Nirano (near Modena), and especially the one at Regnano, near Reggio.

One early twentieth-century scholar (Pantanelli 1910) approached the matter by discussing whether Pliny's description referred solely to an earthquake or also to a mud eruption. While Pantanelli doubted whether there really had been an eruption, De Buoi (1937), in the light of further observations, supported the view that Pliny was describing an eruption of mud volcanoes, and actually rejected the idea that there had been an earthquake at all. The question was whether to accept as realistic or not Pliny's reference to what a number of Roman knights were supposed to have seen from the Via Emilia ("two mountains crashed together with a thunderous noise and then jumped backwards and forwards, and in broad daylight flames and smoke rose into the sky from between them").

According to Pantanelli's rough estimate, the witnesses must have been at least 10 km from the foothills where the mud volcanoes are situated to this day. But in spite of Pantanelli's view, the distance involved is not in fact excessive, especially if one keeps

in mind that these mud eruptions can be very large and can be seen many miles away. Evidence to support this suggestion can be found in a description of what happened at Alat, on the western shore of the Caspian Sea, on the night of 11 June 1859. According to Stoppani (1908, p.497), the explosion and burning gas which accompanied the eruption were seen more than 21 km away, at Baku. It is not impossible therefore, that what happened in 91 B.C. was not just an earthquake, but a mud eruption as well; and indeed both occurrences fit the geological and seismological nature of the area.

According to Tamrazyan (1972), the principal mud volcano eruptions observed in the Caspian Sea area between 1948 and 1970 corresponded to lunar phases (syzygies). This observation confirms that crustal deformations due to microgravitational changes could be clearly revealed by natural strain gauges like mud volcanoes, because of their dynamic peculiarities as confined fluid occurrences (Bodvarsson 1970). Crustal deformations induced by astrophysical phenomena have an order of magnitude (in terms of energy) smaller or equal to that generated by minor earthquakes. In this case, deep fluids in particular conditions (Nikolaevskii 1993) could be sensitive to pre-earthquake crustal deformations. These considerations strengthen the hypothesis that strong eruptive phenomena may be accompanied by a seismic event.

<057> before 88 B.C. ●●Apamea (Phrygia)

sources Nic. Dam. *FGrHist* 90 F 74; Strabo 12.8.18
literature Robert (1962); McGing (1986)
catalogues Guidoboni (1989)

Nicolaus Damascenus writes: "At the time of the war of Mithridates, after some earthquakes, there appeared near Apamea in Phrygia some lakes which did not previously exist, as well as some rivers and some new springs, which came into being as a result of the movement of the earth, while many others disappeared; and in the area where they were, there came to the surface such a quantity of pale blue salt water that, in spite of the great distance from the sea, the surrounding area filled with shells and the other fish which live in the sea".

Περὶ Ἀπάμειαν τὴν Φρυγιακὴν κατὰ τὰ Μιθριδατικὰ σεισμῶν γενομένων ἀνεφάνησαν περὶ τὴν χώραν αὐτῶν λίμναι τε [αἱ] πρότερον οὐκ οὔσαι καὶ ἄλλαι πηγαὶ ὑπὸ τῆς κινήσεως ἀνοιχθεῖσαι, πολλαὶ δὲ καὶ ἠφανίσθησαν· τοσοῦτόν τε ἄλλο ἀνέβλυσεν αὐτῶν ἐν τῇ γῇ πικρὸν τε καὶ γλαυκὸν ὕδωρ πλείστον ὅσον ἀπεχούσης τῶν τόπων τῆς θαλάσσης, ὥστε ὀστρέων πλησθῆναι τὸν πλησίον τόπον ἅπαντα καὶ ἰχθύων τῶν τε ἄλλων, ὅσα τρέφει ἡ θάλασσα.

For the identification of Apamea and the lake, see Robert (1962, pp.338ff.). Strabo's evidence provides a better dating: "Amongst other cities, Apamea was often struck by earthquakes before the expedition of Mithridates; and when he went there and saw the damage, he gave one hundred talents for rebuilding".

Καὶ τῶν ἄλλων δὲ πόλεων Ἀπάμεια μὲν καὶ πρὸ τῆς Μιθριδάτου στρατείας ἐσεισθῆναι πολλάκις, καὶ ἔδωκεν ἐπελθὼν ὁ βασιλεὺς ἑκατὸν τάλαντα εἰς ἐπανόρθωσιν, ὁρῶν ἀνατετραμμένην τὴν πόλιν.

This passage does not refer to a series of earthquakes, but merely points to earlier seismic events in the history of Apamea. See entry <028> above. The entry of Mithridates into Apamea is one of the first episodes of his first war (89-5 B.C.). An examination of the sources suggests a dating of 88 B.C. — the year in which he entered Phrygia and expelled the Roman garrison from Apamea (see McGing 1986, p.109). It is not possible to give an exact date for the earthquake, but it must have occurred in

the years immediately preceding this. Historians of Mithridates were concerned to emphasise his commitment to rebuilding, and did so by pointing out that the city had been helped in similar circumstances by Alexander the Great (see entry <028>), whom Mithridates was evidently emulating. (In this connection, see App. *Mithr.* 101; McGing 1986, p.101).

<058> **83 B.C. • Rome**

- sources App. *Bell. civ.* 1.83
 literature Molin and Guidoboni (1989)
 catalogues Bonito (1691); Schmidt (1881); Mercalli (1883); Baratta (1892); Guidoboni (1989)

This earthquake is recorded by Appian of Alexandria. Although he lived as late as the 2nd century A.D., he is an excellent source, and in his narrative of the civil wars in Rome proves to be using good 1st century B.C. sources.

Appian records the 83 B.C. earthquake amongst prodigies connected with the civil war. He tells of phenomena considered to be supernatural, and records the earthquake as having been brought about by a god. He writes that the earthquake caused certain temples in Rome to collapse, but he does not identify the individual temples: "The god made the earth shake for a long time, and caused some temples to collapse in Rome".

Τήν τε γῆν ὁ θεὸς ἐπὶ μέγα ἔσεισε καὶ νεὼς τινὰς ἐν Ῥώμῃ κατήνευκε.

<059> **76 B.C. • Reate**

- sources Obseq. 59
 catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Mercalli (1883); Galli (1906); Guidoboni (1989)

As in the case of other seismic events recorded in Italy for the 2nd and 1st century B.C., and for which we lack evidence from Livy, the source is a late one (4th century A.D.). However, there is no doubt about Julius Obsequens' reliability.

Obsequens records that a violent earthquake struck Reate (now Rieti) and the surrounding area in 76 B.C.: "At Reate, town and country temples were shaken by an earthquake, the stone paving of the forum was broken up, bridges collapsed, the banks of the river collapsed into the water, rumblings were heard in the earth, and after a few days anything that had been shaken collapsed".

Reate terrae motu aedes sacrae in oppido agrisque commotae, saxa, quibus forum stratum erat, discussa, pontes interrupti, ripae <prae>labentis fluminis in aquam provolutae, fremitus inferni exauditi et post paucos dies, quae concussa erant, corruerunt.

The reference to bridges collapsing and to the effect on the paving of the forum and the banks of the river (probably what is now the Velino), suggests that the earthquake must have been particularly destructive.

<060> **72-70 B.C. • Rome**

- sources Phleg. *FGrHist* 257 F 12, from Phot. *Bib.* 2.97
 literature Jacoby (1930); Molin and Guidoboni (1989)
 catalogues Guidoboni (1989)

This earthquake is known from a fragment of Phlegon of Tralles' historical work, as preserved by Photius (9th century A.D.): "there was an earthquake in Rome, and many houses collapsed there; and there were many other occurrences during that Olympiad [the one hundred and seventy-seventh]".

Καὶ σεισμοῦ ἐν Ῥώμῃ γενομένου πολλὰ ταύτης σενέπεσε. Καὶ ἄλλα δὲ πλεῖστα ἐκ ταύτης ξυνηγέχθη Ὀλυμπιάδι.

Phlegon was writing in the first half of the 2nd century A.D., and used good quality sources for his chronographic work on the Olympiads. The dating in terms of the four-year cycle of Olympiads makes it possible to calculate the date as 72-69 B.C. The more specific dating to 72-70 B.C. is in Jacoby (1930, pp.841 ff.).

<061> **c.65 B.C. ●Antioch, ●Syria**

sources 1 Pomp. Trog. *apud* Just. *Epit.* 40.2.1; Mal. 211.16-9

sources 2 Dio Cass. 37.11.4; Oros. *Hist.* 6.5.1

literature Münzer (1930); Downey (1938 a-b, 1961); Rizzo (1963); Alonso-Núñez (1992)

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); Sieberg (1932 a); Ben-Menahem (1979)

The historical evidence for this earthquake consists of four accounts by ancient historians from the 1st to the 6th century A.D. However, only two of them — Trogus and Malalas — provide information of any value. The other two — Dio Cassius and Orosius — offer very scanty data, which prove to be less than clear. In fact, the obscurity of the passages in Dio and Orosius — they do not even provide an indication of the geographical area where the earthquake occurred — has given rise to a remarkable misunderstanding, for what they wrote has been related to an earthquake at Kerch in the Crimea in 63 B.C. (see entry <062>). We have tried to clarify the circumstances of this event by analysing the historical context.

Reliable evidence of an earthquake in Syria and at Antioch. In his *Epitome* of Trogus, Justinus refers to what Pompeus Trogus had to say about a destructive earthquake in Syria which caused thousands of deaths: "Although Syria was safe from enemy attack, it was devastated by an earthquake, which killed one hundred and seventy thousand people and destroyed many cities. The haruspices declared that this prodigy foretold a change in things".

Sed sicut ab hostibus tuta Syria fuit, ita terrae motu vastata est, quo centum septuaginta milia hominum et multae urbes perierunt. Quod prodigium mutationem rerum portendere aruspices responderunt.

This very concise passage refers to the last period of the rule of Tigranes of Armenia, an ally of Mithridates, in Syria. This important king of Armenia (95-c.55 B.C.) is generally known as Tigranes the Great or Tigranes II (though it is not certain that a Tigranes I of Armenia ever existed). Tigranes was defeated by Lucullus in 69 B.C., and had to give up all regions previously under his control, except Armenia. This passage, however, suggests a dating of the earthquake to about 65 B.C., because Trogus twice specifies that Tigranes' rule lasted for eighteen years, whereas the Appian tradition (Syr. 69) suggests fourteen years, hence making the end of Tigranes' rule over Syria coincide with his defeat at the hands of Lucullus (see Rizzo 1963, pp.62ff.).

The earthquake is definitely to be related to Malalas' remark that Pompey was generous to Antioch, "and rebuilt the bouleuterion, for it had fallen down".

καὶ κτίσας τὸ βουλευτήριον. πεσόντα ἦν γάρ.

Although Malalas lived about seven centuries after the event, his evidence is nevertheless important, for we know that he used valuable local sources. The context justifies dating this rebuilding work to immediately after Pompey's conquest of 65/4 B.C.

Pompeus Trogus' account must be taken seriously. In fact, he pays special attention to the importance of earthquakes in history, and tends to associate natural phenomena with historical events (Rizzo 1963, p.58; Alonso-Núñez 1992, p.88ff., 101ff.).

Moreover, he had available first-hand information about Pompey's war in Anatolia: an uncle of his commanded a troop of cavalry in support of Pompey (see Rizzo, 1963, p.61; Alonso-Núñez 1992, p.16).

Rizzo (1963, p.77) thought that knowledge of the earthquake had passed through the filter of Strabo's historical work (now lost). There is no way of knowing whether that it so, however, and in any case one may share Rizzo's own view that mentioning the earthquake is a kind of two-edged historiographical weapon, intended to underline the advantages to Syria of Tigranes' rule, which Trogus clearly regarded with favour (see Rizzo 1963, p.63). The effect of the earthquake was thus to change the political picture. Downey (1938 a, p.107ff., with bibliography; 1961, p.140ff.) has attempted to date the earthquake more accurately. On the basis of Malalas (225), he has pointed out that the Romans carried out public works at Antioch, under the supervision of Q.Marcus Rex; and since Marcus was proconsul in Cilicia in 67 B.C., he suggests dating the earthquake to c.67-66 B.C. This friendly act by the Romans was undoubtedly a diplomatic move in preparation for the subsequent conquest, and Downey thinks that it was a question of rebuilding after the Trogus earthquake, which he dates to 69 B.C., following the chronology in Appian, as historians usually do. This is reasonable, but it clashes with Trogus' chronology, which Downey does not take into consideration. The fact is — as Downey himself admits (1938 b, p.145) — that Malalas' account makes the earthquake datable to between 69 and 64, and Q.Marcus Rex (who reappeared in Italy in 63 B.C. to ask for a triumph) may have stayed in the East until at least 65 (evidence in Münzer 1930, cols.1584-5). So Marcus' mission may have taken place only shortly before Pompey's campaign (Pompey was his direct superior), and hence the date of the earthquake does not necessarily have to be moved much earlier than 65 B.C. Whatever the case may be, it is interesting to note that the Romans hastened to rebuild the most important building for public spectacles, and only later went on to rebuild that for political assemblies.

The evidence of Dio Cassius and Orosius: the alleged earthquake at Kerch. An earthquake relating to this same period is recorded by Dio Cassius, but without any specific indication as to where it occurred: "Since the Roman forces were steadily increasing their hold and those of Mithridates were becoming steadily weaker, and also partly because one of the greatest earthquakes ever recorded came and destroyed many of their cities, [Mithridates'] allies departed and the army broke up, and there were those who kidnapped some of his sons, and took them to Pompey".

Οἱ δ' ἄλλοι οἱ συνόντες αὐτῷ, ὡς τὰ τε τῶν Ῥωμαίων ἰσχυρότερα καὶ τὰ τοῦ Μιθριδάτου ἀσθενέστερα αἰεὶ ἐγίνετο (τὰ τε γὰρ ἄλλα καὶ ὁ σεισμός μέγιστος δὴ τῶν πώποτε συνεχθεὶς αὐτοῖς πολλὰς τῶν πόλεων ἔφθειρεν), ἡλλοιοῦντο, καὶ τὰ τε στρατιωτικὰ ἐκινεῖτο, καὶ παῖδας τινὰς αὐτοῦ συναρπάσαντές τινες πρὸς τὸν Πομπήιον ἐκόμισαν.

The same earthquake seems to be mentioned in a passage in Paulus Orosius, where he records an earthquake in the cities controlled by Mithridates shortly before his death (63 B.C.): "When Mithridates was in the Bosphorus to celebrate the feast of Ceres, there came a sudden earthquake so violent that it is said to have had disastrous effects in town and country alike".

In Bosphoro Mithridate Cerealia sacra celebrante terrae motus adeo gravis repente exortus est, ut magna clades ex eo urbium atque agrorum secuta narretur.

As we have pointed out in entry (062), a great deal of the literature locates this event in the Crimea. In fact, however, there is insufficient evidence to establish that the earthquake occurred there. Paulus Orosius seems to have been relying on Livy (whose coverage of this period is unfortunately missing), and must have been summarising a much more substantial narrative, for he simply reports, in succinct terms,

that the earthquake occurred "while Mithridates was celebrating the feast of Ceres in the Bosphorus". But this is not reliable evidence in itself: for there is no inevitable logical link between the seismic event and the location in the Cimmerian Bosphorus. In other words, the fact that Orosius juxtaposes the one and the other does not imply that he wishes to establish some relationship between them. Nor is there any other evidence to account for such a relationship.

There remain some historical details to be added. On the basis of slender historiographical evidence, historians have claimed that the closing years of the reign of Mithridates were completely confined to the Bosphorus, where he had been obliged to take refuge because of Pompey's military campaigns between 67/66 and 65/64 B.C. Hence the view that the references by Dio Cassius and Paulus Orosius to an earthquake which had struck "the cities of Mithridates" could no longer be taken as referring to Pontus.

There are, however, two objections to this view: one of a pragmatic kind, and the second based on historiographical analysis.

a) Most important of all, in recording a revolt organised by Mithridates' own son Pharnaces, Appian (*Mithr.* 108) describes the cities of the Bosphorus and the Crimea which had abandoned Mithridates as being in an excellent state of preparation for war. These could not, then, have been the cities struck by the earthquake. Mithridates himself easily resisted the revolt at Panticapaeum, and the city was only taken as a result of a conspiracy and trickery (Appian, *Mithr.* 110). Furthermore, Appian makes no mention of *any* earthquake in the Crimea.

b) Both Dio Cassius and Paulus Orosius depend, at least in part, on a tradition hostile to Pompey, which may have come, through Livy, from an author such as Timagenes of Alexandria. While Livy (Orosius' source) was pro-Pompey, he was also a serious historian who knew his sources, and as such he could not ignore an event of importance like this earthquake. But he placed his reconstruction of events within a context of his own design, where Mithridates appears as a man whose course is run, who is being hunted down by the Romans and his other enemies, and who is finally forced to take refuge in the stronghold of Panticapaeum, since Pontus was in the hands of the Romans. This was a schematic but effective historical interpretation, which at least in its general lines agreed with the account of Appian, but (in accordance with Livy's interest in prodigies) it included the detail of the earthquake.

As Appian suggests, however, Mithridates had in fact good reasons for hoping that he might make a comeback up to the last moment. There is no doubt that he was obliged to retreat into the Crimea for strategic reasons, and he must have done so in about 66 B.C. He must have felt safe in the territory of his former kingdom, especially at a time when circumstances had obliged Pompey to move part of his army, in 66 B.C., for the conquest of Syria and the neutralisation of king Tigranes II of Armenia.

This is the point at which the earthquake is likely to have occurred: with Mithridates in the Cimmerian Bosphorus, it will have eliminated any possibility of his going back, deprived him of any chance of breaking the Roman naval blockade, and fomented rebellion even in the Greek cities of the Bosphorus and the Crimea which, as we have seen, were not affected by the earthquake.

There was thus no deliberate falsification, but there is very little that we can add to the available information. However, the comparison with Appian, together with archaeological evidence, confirms that there is no reason to believe that the earthquake occurred in the Cimmerian Bosphorus. We therefore reject the Crimea, and return to our previous hypothesis (Guidoboni 1989, p.655) that the earthquake occurred in an unidentified part of Pontus Euxinus.

On the basis of what we have set out above, therefore, it seems likely that the earthquake occurred in Pontus after 66 and before 64 B.C., that is to say after Mithridates' flight from Pontus and before the conference of Amisus, when Pompey finally settled

the pacification of Asia Minor. Mithridates could at least hope that the Greek cities of Pontus — which effectively enjoyed as much autonomy under Mithridates as under the Romans — would continue to be his principal economic asset, and he was confident of returning to Pontus, where he had left many of his supporters, at a more suitable moment.

It is certainly no coincidence that the Paulus Orosius tradition associated the earthquake with the time when Mithridates was celebrating the rites of “Ceres”, the Roman equivalent of Demeter, the goddess of fertility and crops — a sign that the gods were depriving Mithridates of their support by removing his sources of supply. The Livy tradition had no interest at all in drawing attention to this fact, for it did not wish to diminish the extent of Pompey’s achievement, and what happened was certainly to his advantage. Paulus Orosius describes himself as an anti-pagan (and therefore anti-Roman) writer, but his narrative owes much to Livy, whom he used for his references to earthquakes and other disasters, interpreting them as a divine punishment on the pagans. In this particular instance, he may have taken the earthquake as a punishment inflicted on the pagan Mithridates at the moment when he was celebrating the rites of “Ceres”.

This tradition in fact confines itself to interpreting the earthquake as one of the causes of Mithridates’ downfall. It is very likely that Livy himself (and he was Paulus Orosius’ source, in our opinion) also made use of contemporary writers who were partisans of Mithridates, such as Timagenes of Alexandria, taking due note of the information they provided, and selecting as he thought fit.

However, the theory that the earthquake took place in Pontus has the serious drawback that it is not supported by any sources at all. Indeed, there seems to be no reason why one should not put forward a quite different hypothesis: that the earthquake recorded by Dio Cassius and Paulus Orosius is the one referred to by Trogus/Justinus in Syria. Let us return to what Dio Cassius wrote: “partly because [...] earthquakes [...] destroyed many of their cities, [Mithridates’] allies departed and the army broke up”. The “allies” referred to may have been supporters of his such as Tigranes II of Armenia, who governed Syria before his defeat at the hands of Lucullus. The earthquake would therefore have helped to intensify the crisis amongst the enemies of Rome, and finally destroy the alliance between Mithridates and Tigranes. It is also reasonable to suggest that the earthquake in Syria not only created foreign policy problems for Mithridates, but also discouraged the cities from further resisting Rome.

Final observations based on a comparison of the sources. Now let us take up once more what Trogus/Justinus have to say about Syria. The time factor seems to be different in their account from those in Dio Cassius and Paulus Orosius, for, unlike Trogus/Justinus, they mention the earthquake in Syria as occurring after Pompey’s arrival there. What Pompeus Trogus has to say is of importance, anyway, because, as we have mentioned above, he had oral sources available for Pompey’s campaign in Syria. On the other hand, it seems that Appian prefers to deny that Tigranes interfered in the affairs of Syria at all. As Rizzo has pointed out (1963, pp.64ff.), Appian is nearer the mark in dating the end of Tigranes’ dominion over Syria to 69 B.C.; but that does not necessarily mean that the date 65 which we can deduce from Trogus/Justinus is the result of a mistake on their part, because the situation in Syria continued to be very complicated until Pompey arrived. He may in fact have taken advantage of the earthquake — which would explain the passage in Appian (Syr. 60) where we are told that Pompey took control of Syria “without fighting”.

Trogus’ stance is quite different from that of the Livy tradition (Rizzo 1963, p.70), which almost certainly underlies the work of Dio Cassius and Paulus Orosius. Livy probably got his information about the earthquake from official Roman sources (see Rizzo 1963, p.74); these documents included prodigy lists, and Livy must have thought it quite natural to place the earthquake close to the time of Mithridates’

death. Trogus, on the other hand, whether he was using Strabo or oral sources, had more reliable information; and it is not unlikely that Livy (or Dio Cassius and Paulus Orosius after him) somehow inserted the report of the earthquake (for which, moreover, he gives no date or accurate location) into his account of the downfall of Mithridates. Without more accurate information, we think it inappropriate to integrate the two traditions, especially since they not only differ about the earthquake, but also disagree on nearly all the historical background (see Rizzo 1963 for a general consideration of this), thereby revealing the attempts by the various historiographical trends to make the available data fit their own ideological requirements.

- proved not to have taken place <062> **63 B.C. Panticapaeum, Crimea**
- | | |
|------------|--|
| sources | Dio Cass. 37.11.4; Oros. <i>Hist.</i> 6.5.1 [negative Strabo 7.4.5; App. <i>Syr.</i> 60, 69, <i>Mithr.</i> 108, 110] |
| literature | Blavatsky (1964, 1977); Arakeljan (1983); SGA – Report (1991); Traina (1994 b) |
| catalogues | Smirnov (1931); Popov (1969); Ananyn (1977); Guidoboni (1989) |

It is commonly held, in some historical, archaeological and seismological studies that what Paulus Orosius writes at 6.5.1 is evidence of a destructive earthquake in the Crimea in 63 B.C.; but what he in fact records is an earthquake in the cities controlled by Mithridates shortly before his death (63 B.C.): “When Mithridates was in the Bosphorus to celebrate the feast of Ceres, there came a sudden earthquake so violent that it is said to have had disastrous effects in town and country alike”.

In Bosphoro Mithridate Cerealia sacra celebrante terrae motus adeo gravis repente exortus est, ut magna clades ex eo urbium atque agrorum secuta narretur.

The same event had already been mentioned by Dio Cassius (37.11.4); but he does not refer to the Crimea (see entry <061>). Orosius is referring to the same earthquake as Dio Cassius, and it must have occurred close to the year 63 B.C., for that was the year in which Mithridates died. Both writers situate the event within the climate of the rapid dissolution of his reign; but there is no reliable evidence to confirm that the earthquake occurred in the Bosphorus (where Mithridates was indeed at the time of its occurrence).

The earthquake is also thought to have particularly affected the city of Panticapaeum (present-day Kerch). This was, in fact, the last place of residence of Mithridates before his death, and the context provided by both historians seems to provide an effective link between these events in terms of their sequence. Furthermore, the great archaeologist Blavatsky (1977; see also 1964) took the numerous collapses and restorations which he found at Kerch (in the north-east of the Crimea) to be archaeological confirmation that the earthquake had indeed occurred there. (For the possibility that the earthquake occurred in Pontus rather than the Crimea, see entry <061>).

In our view, neither the nature of the evidence nor the historical context supports this assumption; and as further proof of this, we also note that authors such as Strabo, and especially Appian, do not mention the earthquake at all, though they deal with Crimean affairs during the Mithridatic war (see the detailed discussion in entry <061>). Moreover, Blavatsky's argument is based principally on an archaeological examination of collapses, but it is quite impossible to accept that as convincing evidence of an earthquake, for the region concerned had long been subjected to almost continuous military destruction, partly caused by sieges and raids, and partly by landslips resulting from the exposure of city walls to intense pressure from soldiers and their siege machines. In any case, the restoration work discovered by Blavatsky dates to at least twenty-five years after the death of Mithridates, which means the damage was not so serious as to require urgent reconstruction (see Arakeljan 1983).

<063> 63 B.C. ● Spoletium

sources Cic. Cat. 3.8.18; Plut. Cic. 14.3; Dio Cass. 37.25.1-2; Obseq. 61

catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Mercalli (1883); Guidoboni (1989)

There were frequent earthquakes in the year 63 B.C., when Cicero was consul. The sources list them amongst prodigies, which were particularly numerous that year and coincided with dramatic political events. In his third Catilinarian oration, Cicero suggests a specific connection between the portents which had been heard or seen, and the famous conspiracy: "For quite apart from certain prodigies, such as the glow which lit up the sky at night in the west; quite apart from the thunderbolts which came down, and the earthquakes, and quite apart from all the other prodigies which occurred in such great numbers while I was consul that the gods seem to have predicted present events".

Nam ut illa omittam, visas nocturno tempore ab occidente faces ardoremque caeli, ut fulminum iactus, ut terrae motus relinquam, ut omittam cetera quae tam multa nobis consulibus facta sunt ut haec quae nunc fiunt canere di immortales viderentur.

Everything listed in Cicero's speech is interpreted as a prediction of the disturbing events of that particular time. The speech was made at the period of the events themselves, and the rapid mention of the earthquake is for rhetorical effect.

A similar brief comment appears in Plutarch: "Moreover, even the heavenly powers seemed, by earthquakes and thunderbolts and apparitions, to foreshadow what was going to happen".

Ἐδόκει δὲ καὶ τὸ δαιμόνιον προσημαίνειν τὰ πρασσόμενα σεισμοῖς καὶ κεραυνοῖς καὶ φάσμασιν.

Dio Cassius writes in the same tone: "Many thunderbolts fell from a clear sky, the earth was violently shaken, and human apparitions were seen in many places".

Καὶ ἄλλα τε αὐτοῖς σημεῖα οὐκ αἴσια συνηνέχθη· κεραυνοὶ τε γὰρ ἐν αἰθρίᾳ πολλοὶ ἔπεσον, καὶ ἡ γῆ ἰσχυρῶς ἔσεισθη.

The location of this earthquake, or at least of one of those which occurred in that year, is to be found in Obsequens, who records its effect on Spoletium (now Spoleto): "The whole of Spoletium was shaken by an earthquake, and some buildings collapsed".

Terrae motu Spoletum totum concussum, et quaedam corruerunt.

<064> 58 B.C. Dyrrachium ▷ seismic sea-wave? <

sources Plut. Cic. 32.4

catalogues Capelle (1924); Ambraseys (1962 b); Guidoboni (1989)

In his *Life of Cicero*, Plutarch mentions an earthquake which was felt at Dyrrachium: "They say that when he [Cicero] made the crossing to Dyrrachium [to go into exile], and was about to land, there was an earthquake and a sea-wave. The soothsayers concluded from this that his exile would not last for long, for such phenomena are signs of change".

Λέγεται δὲ καὶ καταπλεύσαντος εἰς Δυρράχιον αὐτοῦ καὶ μέλλοντος ἀποβαίνειν, σεισμόν τε τῆς γῆς καὶ σπασμόν ἅμα γενέσθαι τῆς θαλάσσης. ἀφ' ὧν συνέβαλον οἱ μαντικοὶ μὴ μόνιμον αὐτῷ τὴν φυγὴν ἔσεσθαι· μεταβολῆς γὰρ εἶναι ταῦτα σημεῖα.

This is an apparently isolated piece of evidence, used by Plutarch simply to throw light on the order of events in Cicero's life.

< 065 > **end of April-beginning of May 56 B.C. Potentia**

sources Cic. *Har. resp.* 28.62-3; Dio Cass. 39.20.1-2

literature Rawson (1985); Polverini (1987); Traina (1994 a)

catalogues Guidoboni (1989)

Cicero probably delivered his oration *De haruspicum responsis* between 6 and 14 May 56 B.C. It closes as follows: "Think about the nature of the noise which the people of Latium reported. Remember, too, a prodigy that has not yet been officially recorded: it is reported that a tremendous earthquake took place at Potentia in Picenum [3 km S of Porto Recanati, Province of Macerata], and that there were other accompanying prodigies and alarming events at almost the same time. You will certainly feel a thrill of fear at the impending ills which I foresee. In fact it is the voice of the immortal gods. You are bound to recognise that it is they who are speaking to us when the world itself and all its lands and seas are shaken by a strange earthquake, and with an amazing thunderous noise we are forewarned of some future event. In this situation we must arrange those propitiatory and expiatory ceremonies which are required of us".

Cogitate genus sonitus eius, quem Latinienses nuntiarunt, recordamini illud etiam, quod nondum est relatum, quod eodem fere tempore factus in agro Piceno Potentiae nuntiatur terrae motus horribilis cum quibusdam multis metuendis rebus. Haec eadem profecto quae prospicimus impendentia pertimescetis. Etenim haec deorum immortalium vox, haec paene oratio iudicanda est, cum ipse mundus cum maria atque terrae motu quodam novo contremiscunt et inusitato aliquid sono incredibilique praedicunt. In quo constituendae nobis quidem sunt procurationes et obsecratio, quem ad modum monemur.

Bearing in mind that such items of news would be fairly slow to circulate, we may conclude that the earthquake occurred a few weeks before the speech was delivered in the senate.

If Cicero delivered his speech soon after the actual occurrence of the Potentia earthquake, it is unlikely that he could have obtained his information from archival sources; and he himself says of it: *quod nondum est relatum*. This suggests the possibility that information was acquired direct from a local observer; and so there comes to mind a figure such as the scholar L. Tarutius Firmanus, who wrote a treatise *On the stars* and was apparently directly responsible for the Varronian calculation of the foundation of Rome (Rawson 1985, pp.307-8). It is true that Firmanus might be a *cognomen* and not an adjective of origin, but recent evidence collected by Polverini (1987, pp.36-7, 59) would seem to support the suggestion that Tarutius came from Fermo. In any case, whether the person in question was Tarutius or some other friend of Cicero from Picenum, an oral source would explain the particular reference to Potentia (Traina 1994 a).

Dio Cassius also records the prodigies of 56 B.C., in a passage which has come down to us by direct tradition: "in the Alban Hills a small temple to Juno, set on a kind of platform facing east, was turned towards the north; a blaze of light darted from the south across to the north; a wolf entered the city; an earthquake occurred; some citizens were killed by thunderbolts; in Latin territory a subterranean tumult was heard; and the soothsayers, being anxious to find a remedy, said that some temples or consecrated sites were being used as places of residence".

Ἐν τε γὰρ τῷ Ἀλβανῷ νεὼς Ἦρας βραχὺς ἐπὶ τραπέζης τινὸς πρὸς ἀνατολῶν ἰδρυμένος πρὸς τὴν ἄρκτον μετεστράφη, καὶ λαμπὰς ἀπὸ τῆς μεσημβρίας ὀρμηθεῖσα πρὸς βορέαν διῆξε, λύκος τε ἐς τὴν πόλιν ἐσῆλθε, καὶ σεισμὸς ἐγένετο, τῶν τε πολιτῶν τινες κεραυνοῖς ἐφθάρησαν, καὶ θόρυβος ἐν τῷ Λατίνῳ ὑπὸ γῆς ἐξηκούσθη· καὶ αὐτὰ οἱ μάντιες ἀκέσασθαι ἐθελήσαντες ὀργίζεσθαι σφισι δαιμόνιον τι ὥς καὶ ἱερῶν τινων ἢ χωρίων οὐχ ὁσίων ἐποικουμένων ἔφασαν.

<066> **about the mid-1st century B.C. the island of Delos**

sources Varro *apud* Plin. *n.h.* 4.66

catalogues Guidoboni (1989)

This earthquake is mentioned briefly by Pliny, who refers back to Varro as his authority. It brings up once again the delicate matter of the inviolability of the island of Delos, which was sacred to Apollo and, according to contemporary opinion, only subject to earthquakes in exceptional circumstances (see also entries <004>, <011> and <023>): “Delos is in the middle of the Cyclades, and is by far the most famous and most frequented of them, both for the temple of Apollo and the market. We are told that for a long time the island was tossed about, and was the only one not to be struck by an earthquake until the time of M. Varro. Mucianus says that it was twice shaken by earthquakes”.

Longe clarissima et Cycladum media ac templo Apollinis et mercatu celebrata Delos, quae diu fluctuata, ut proditur, sola motum terrae non sensit ad M. Varronis aetatem. Mucianus prodidit bis concussam.

<067> **49 B.C. Rome?**

sources Dio Cass. 41.14.3

literature Millar (1964)

catalogues Mercalli (1883); Baratta (1892); Guidoboni (1989)

Frequent earthquakes appear amongst the prodigies recorded by Dio Cassius for early 49 B.C. — the first year of the civil war between Caesar and Pompey: “and continual earthquakes with bellowing noises took place, fire darted across from the west to the east, and another fire consumed the temple of Quirinus as well as other buildings”.

Καὶ σεισμοὶ συνεχεῖς μετὰ μυκηθμῶν ἐγένοντο, πῦρ τε ἀπὸ δυσμῶν πρὸς ἀνατολὰς διῆξε, καὶ ἕτερον ἄλλα τε καὶ τὸν τοῦ Κυρίνου ναὸν κατέφλεξεν.

The context suggests that the earthquake was also felt in Rome, since the passage from Dio Cassius seems to refer only to prodigies in that city. In spite of being a late source, Dio Cassius is important for events of this kind, being particularly interested in prodigies (see Millar 1964, p. 77).

<068> **47 B.C. Rome?**

sources Dio Cass. 42.26.3

catalogues Mercalli (1883); Baratta (1892); Guidoboni (1989)

Dio Cassius records an earthquake in 47 B.C.: “The following year a violent earthquake occurred, an owl was seen, thunderbolts descended upon the Capitol and upon the temple of Public Fortune, as it was called, and into the gardens of Caesar”.

Τῷ τε ἐχομένῳ σεισμὸς τε ἰσχυρὸς ἐγένετο καὶ βύας ὥφθη, κεραυνοὶ τε ἔς τε τὸ

Καπιτώλιον καὶ ἐς τὸν τῆς Τύχης τῆς δημοσίας καλουμένης ναὸν ἕς τε τοὺς τοῦ Καίσαρος κήπους κατέσκηψαν.

This information appears in a list of prodigies, nearly all of which occurred in Rome. In fact places and buildings in Rome are specifically mentioned. Although we are not told where the earthquake took place but only when, the context supports the view that it was felt in Rome.

〈069〉 44 B.C. **the Alps?**

sources Verg. *Georg.* 1.469-80; Plin. *n.h.* 2.194; Obseq. 68

catalogues von Hoff (1840); Guidoboni (1989)

It is possible to identify this earthquake only in the vaguest terms. It seems to be recorded by the sources more because it coincided with an important moment in Roman history than for its intrinsic effect. According to Virgil, earth tremors in the Alps were among the prodigies which followed the assassination of Julius Caesar: "Indeed it was at that time that the earth, too, and the waters of the sea, as well as dogs of ill omen and sinister birds, told of what was to come. How many times have we seen Mount Etna deluge the land of the Cyclops with balls of fire and molten rocks from her cracked furnaces! Germany heard a clash of arms across the whole heavens; and the Alps shuddered with strange tremors. A voice, too, disturbed the whole silence of the sacred woods — a loud voice. And as the darkness of night approached, strangely pale ghosts appeared and, oh terrible omen, animals spoke. Rivers stop flowing, the earth opens up, and in temples ivories mournfully weep and bronzes sweat".

*Tempore quamquam illo tellus quoque et aequora ponti, / obscenaeque canes importu-
naeque volucres / signa dabant. quotiens Cyclopum effervere in agros / vidimus
undantem ruptis fornacibus Aetnam, / flammarumque globos liquefactaque volvere
saxa! / armorum sonitum toto Germania caelo / audiit, insolitis tremuerunt motibus
Alpes. / vox quoque per lucos volgo exaudita silentis / ingens, et simulacra modis pal-
lencia miris / visa sub obscurum noctis, pecudesque locutae, / infandum! sistunt
amnes terraeque dehiscunt, / et maestum inlacrimat templis ebur aeraque sudant.*

All the phenomena mentioned, whether natural or supernatural, are seen as foreshadowing the civil war which resulted from the terrible crime of the assassination of Caesar. The events described are momentous and ill-omened, but they are not as catastrophic as the war itself, which is seen as a divine punishment for the terrible crime. It is possible that Virgil's imagination and his search for symbolic images were stimulated by real events. Pliny's suggestion (*n.h.* 2.194) that the Alps and Apennines were areas of seismic activity is equally vague: "I have ascertained that tremors have frequently occurred in the Alps and Apennines".

Exploratum mihi est Alpes Appenninumque saepius tremuisse.

Obsequens also records the earthquake at that year, perhaps deriving his information from some historical source: "there were frequent earthquakes".

Terrae motus crebri fuerunt.

〈070〉 43 B.C. **Rome?**

sources Dio Cass. 45.17.4

literature Nissen (1883)

catalogues Mercalli (1883); Guidoboni (1989)

Like most other earthquakes which struck Rome in imperial times, this one is recorded by Dio Cassius, a late but well-informed writer (3rd century A.D.) who was evidently interested in the prodigy tradition.

For 43 B.C. he records: "Another thing that frightened the rest of the population, was a great earthquake".

Τοὺς δὲ ἄλλους ἐκεῖνά τε ἐτάραττε καὶ σεισμὸς μέγας γενόμενος.

This earthquake appears in a list of prodigies, and it is not possible to deduce from the text where it occurred. Nissen (1883, p.285) thought it must have occurred in Rome precisely because no place is mentioned; but that is not always a safe criterion on which to base a judgment.

<071> **the early spring of 31 B.C. ●Diospolis, ●Judea**

sources 1 Ioseph. *BI* 1.369, *AI* 15.121-4

sources 2 Mal. 229

literature Firpo (1989)

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a); Amiran (1950-51); Ben-Menahem (1979); Guidoboni (1989)

In two similar passages in his works, Josephus mentions an earthquake in Judea in the spring of 31 B.C.

In the *Jewish War* (1.369) he writes: "[Herod] subsequently took revenge on the Arabs by continually raiding their territory, so that they often had occasion to regret their one victory. While he was punishing his enemies, however, another disaster struck in the seventh year of his reign, when the war of Actium was at its height. For in the early spring, an earthquake shock killed an infinite number of cattle and thirty thousand people; but the army was unharmed, because it was camped in the open".

Ἐτιμωρήσατο μέντοι τοὺς Ἀραβας αὐθις αἰὲν τὴν χώραν κατατρέχων, ὡς ἀνακαλέσασθαι τὴν μίαν αὐτοῖς νίκην πολλάκις. ἀμυνομένῳ δὲ τοὺς ἐχθροὺς ἐπιπίπτει συμφορὰ δαιμόνιος ἄλλη, κατ' ἔτος μὲν τῆς βασιλείας ἑβδομον, ἀκμάζοντος δὲ τοῦ περὶ Ἀκτίον πολέμου. ἀρχομένου γὰρ ἔαρος ἡ γῆ σεισθεῖσα βοσκημάτων μὲν ἄπειρον πλῆθος ἀνθρώπων δὲ τρεῖς διέφθειρεν μυριάδας, τὸ δὲ στρατιωτικὸν ἔμεινεν ἀβλαβές· ὑπαίθρον γὰρ ἠυλίζετο.

In the *Jewish Antiquities* (15.121-4), he records: "Meanwhile the battle of Actium took place between Caesar and Antony, in the seventh year of Herod's reign, and there was an earthquake in Judea, such as had not occurred before, which killed many cattle throughout the country. And about thirty thousand persons also perished in the ruins of their houses, but the army, which lived in the open, was not at all harmed by this calamity.

When the Arabs learned of it — what had happened had been reported in a form that went beyond the truth by some persons who tried to please their hearers in their hatred (of the Jews) — they became over-confident in the belief that the enemy's land was in ruins and his men destroyed, for now, they thought, there was no longer anything to stand against them. And they seized and killed the envoys of the Jews, who had come to make peace with them as a result of these events, and with great eagerness they marched against their camp.

Ἐν τούτῳ καὶ τῆς ἐπ' Ἀκτίῳ μάχης συνεσταμένης Καίσαρι πρὸς Ἀντώνιον, ἑβδόμου δ' ὄντος Ἡρώδῃ τῆς βασιλείας ἔτους, σεισθεῖσα ἡ γῆ τῶν Ἰουδαίων, ὡς οὐκ ἄλλοτε

ἐδόκει, τῶν ἐν τῇ χώρᾳ κτηνῶν πολὺν φθόρον ἐποίησεν. ἐφθάρησαν δὲ καὶ τῶν ἀνθρώπων ὑπὸ ταῖς πεπτοκυῖαις οἰκίαις περὶ τρισμυρίου· τὸ μόντοι στρατιωτικὸν ἐν ὑπαιθρῷ διαιτώμενον οὐδὲν ὑπὸ τοῦ πάθους κατεβλάβη. ταῦτα πυνθανομένοις τοῖς Ἀραφιν, καὶ μᾶλλον ἢ κατ' ἀλήθειαν ἐξαγγελλοντων αὐτοῖς ὅσοι τοὺς ὑπὲρ τῶν γεγονότων λόγους τῷ μίσει τῶν ἀκουσομένων ἐχαρίζοντο, μεῖζον ἐπήει φρονεῖν, ὥς τῆς τε χώρας ἀνατετραμμένης τοῖς πολεμίοις καὶ διεφθορότων τῶν ἀνθρώπων μηδὲν ἔτι μηδ' εἰς αὐτοὺς ἀντίπαλον καταλελειφθαι δοκεῖν. καὶ τῶν τε Ἰουδαίων τοὺς πρέσβεις (ἦκον γὰρ ἐπὶ τοῖς γεγενημένοις εἰρήνην ποιησόμενοι) συλλαβόντες ἀπέκτειναν, καὶ μετὰ πάσης προθυμίας ἐχώρουν ἐπὶ τὸ στρατιωτικὸν αὐτῶν.

Some archaeologists think this earthquake was the cause of the abandonment of Qumran, which is supposed to have remained unoccupied until 4 B.C. The earthquake can only have been one of the causes of the abandonment, however, because there was also a good deal of military activity going on at the time. For a survey of the problem and a bibliography, see Firpo (1989, pp.187-90).

It is very likely that this is the same earthquake as one recorded by Malalas: "During the reign of the revered Augustus Caesar, a city in Palestine named Salamine [present day Lod] suffered from the wrath of God. Augustus rebuilt the city and called it Diospolis".

Ἐπὶ δὲ τῆς βασιλείας τοῦ αὐτοῦ Αὐγούστου Καίσαρος σεβαστοῦ, ἔπαθεν ὑπὸ θεομηνίας πόλις τῆς Παλαιστίνης ὀνόματι Σαλαμίνη. ἦντινα πόλιν ἐγείρας ὁ αὐτὸς Αὐγουστος ἐπεκάλεσε Διὸς πόλις.

⟨072⟩ **c.27 B.C. Laodicea (Phrygia), ●Thiatyra, ●Tralles, the island of Chios, ●the island of Cos?**

- sources 1 Strabo 12.8.18; *Res Gestae* 6.33-4; Suet. *Aug.* 47, *Tib.* 8; Christodorus, *Chronicle of the city of Tralles*, apud Agath. 2.17
- sources 2 *Orac. Sibyll.* 3.459-62, 5.289-91; Eus. *Hieron. Chron.* 164d; 168d
- inscriptions *IGSKl* 36.1.35; *Inscr. Olympia* 53; *IGR* 4.1237 = *TAM* 5.974
- literature Bücheler (1882); Broughton (1935); Robert (1978); Clementoni (1989)
- catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Sieberg (1932 a); Papazachos and Papazachos (1989); Guidoboni (1989)

When writing about rebuilding at Magnesia and Sardis after the 17 A.D. earthquake, Strabo also mentions earlier rebuilding work at Tralles and Laodicea: "But the emperor [Tiberius] contributed money for their restoration, just as his father had done in earlier times, when the people of Tralles suffered a similar disaster, involving the collapse of the gymnasium and other parts of the city; and he also helped the people of Laodicea".

Ἐπηνώρθωσε δ' ὁ ἡγεμών, χρήματα ἐπιδούς, καθάπερ καὶ πρότερον ἐπὶ τῆς γενομένης συμφορᾶς Τραλλιανοῖς (ἡνίκα τὸ γυμνάσιον καὶ ἄλλα μέρη συνέπεσεν) ὁ πατὴρ αὐτοῦ καὶ τούτοις καὶ Λαοδικεῦσιν.

At 27 B.C., Eusebius records that: "Tralles was reduced to ruins in an earthquake".

Trallis terraemotu considerunt.

There are two relevant passages in the *Sibylline Oracles*, expressed in the usual "prophetic" form. At 3.459-62 we read: "Tralles, the neighbour of Ephesus — an earthquake shall destroy the well-built walls and the wealth of a troubled people; the earth shall spout up water boiling hot, the groaning earth shall swallow them down with a smell of brimstone".

Τράλλεις δ' ἡ γείτων Ἐφέσου σεισμῷ καταλύσει / τείχεά τ' εὐποιήτ' ἀνδρῶν τε λεῶν
βαρυθύμων / ὀμβρήσει δέ τε γαῖα ὕδωρ ζεστόν, ποτὶ δ' αὐτῆς / γαῖα βαρυνομένη
πίεται· ὁσμὴ δέ τε θείου.

And at 5.289-91 we read: "Woe unto you, oh delightful Tralles, and woe unto you, oh beautiful city of Laodicea, for you shall be destroyed and reduced to dust in an earthquake".

Αἰαῖ πολυήρατε Τράλλεις; Αἰαῖ, Λαοδίκεια, καλὴ· ὥς ἀπολεῖσθε σεισμοῖς ὀλλυμεναί τε
καὶ εἰς κόνιν ἀλλαχθεῖσαι.

There is also an anecdote attached to a report of this earthquake in the work of the Byzantine historian Agathias, when he writes, in relation to this period: "The city of Tralles [...] was completely devastated by an earthquake during the reign of the Emperor Augustus".

Αἱ γοῦν Τράλλεις ἡ πόλις; ὑπὸ δὲ τοὺς Αὐγούστου Καίσαρος χρόνους ἐσείσθη τε
ἅπασα καὶ ἀνετράπη, καὶ οὐδὲν αὐτῆς ὅ τι ἐσέσωστο.

He goes on to tell how a humble peasant called Chaeremon saw the destruction and made the long journey to Cantabria to petition Augustus, who was involved in a military campaign there (for which there is historical evidence in 27-24 B.C.). As a result of this petition, Augustus is supposed to have sent a commission to arrange for the city to be rebuilt, and the inhabitants are supposed to have put up a statue in honour of Chaeremon, the author of the epigram recorded in the passage by Agathias. It is thought that Agathias' remarks were taken up by Christodorus of Coptus (Bücheler 1882).

There is plenty of documentary evidence for the rebuilding work carried out by Augustus. An inscription (BCH, 10, 1886, p.516, no.5) dedicated to Augustus by the local senate, describes him as "founder" of the city. And in the *Res Gestae* we read that "Vast sums of money were spent on theatrical events, gladiatorial games, athletics, hunting and mock sea battles, not to mention that given to colonies in Italy, to towns in the provinces which had been destroyed by earthquakes or fire, and to individual friends and senators whose census he had completed".

Impensa praestita in spectacula scaenica et munera gladiatorum atque athletas et venationes et naumachiam, et donata pecunia colonis in Italia, oppidis in provinciis terrae motu incendioque consumptis aut viritim amicis senatoribusque, quorum census explevit, innumerabilis.

There is also a brief reference in Suetonius (Aug. 47) to assistance given by Augustus to unidentified cities: "He rebuilt [other cities] which had been destroyed by earthquakes".

Aut terrae motu subversas denuo condidit.

This earthquake (or series of earthquakes) must have affected a large area, for Agathias ends his comments on Tralles by saying that "Many other cities in Asia, in fact, both those settled by Ionians and those settled by Aeolians [i.e. a large part of the Aegean coast of Asia Minor], suffered a similar fate at that time".

πολλὰς δὲ κατ' ἐκεῖνο τοῦ καιροῦ καὶ ἄλλας πόλεις ἐν τῇ Ἀσίᾳ, Ἰωνικάς τε καὶ Αἰολίδας, παραπλήσια παθεῖν ξυνηνέχθη.

Suetonius says that the young Tiberius "reported to the senate that requests for help had been received from the people of Laodicea, Thiatyra and Chios, which had been struck by an earthquake".

Pro Laodicensi Thiatirensi Chiis terrae motu afflictis opemque implorantibus senatum [Tiberius] deprecatus est.

The date of the request is reckoned to be about 25/24 B.C. (see Clementoni 1989, p.169). There is an inscription from Thiatyra (*IGR* 4.1237 = *TAM* 5.974) which in effect records an earthquake: "[Tiberius Claudius Am]phimachus, that outstanding stephanophoros, was honoured by the Areni and Nagdemi with the erection of a statue, because he had defended and renewed the villages' rights; later on, when the statue and its base were broken in an earthquake, Julia Severina Stratonice, a descendant of his, had the base rebuilt and the statue restored at her own expense, and was responsible for its dedication".

[Τι. Κλαύδιον Ἀμ]φίμαχον, κρά/τιστον στεφανηφόρον, / τειμηθέντα τῇ τοῦ ἀνδριάντος ἀναστάσει ὑπὸ / Ἀρηνῶν καὶ Ναγδήμων / ἐπὶ τῷ ἐκδικῆσαι καὶ ἀποκα/ταστῆσαι τὰ τῶν κωμῶν, / καὶ μετὰ ταῦτα ὑπὸ σεισμοῦ / συντριβέντος τοῦ βωμοῦ / καὶ ἀνδριάντος, / Ἰουλία Σευηρίνα Στρατο/νείκη, ἑγγονος αὐτοῦ / κατασκευάσασα τὸν τε / βωμὸν καὶ ἐπισκευάσασα / τὸν ἀνδριάντα ἐκ τῶν / ιδίων, ἀνέθηκεν.

The editors of the inscription, however, prefer to place it around the first imperial period, without relating it to any particular earthquake among the many which affected these areas.

A decree of the city of Cos in honour of Augustus was found near the sanctuary of Olympia (*Inscr. Olympia* 53). At lines 7-11 it reads: "At the time of the disaster of the earthquakes [---] as saviour and god [the emperor Caesar [Augustus] brought] rebirth to those who had been ruined [...] not to leave it in need [---] it being very just [---] of Roman dominion, not to let the city lie in ruins [---] with benefits [---]".

Τῆς δὲ τῶν σεισμῶν περιστάσεως --- / ---] μου μετὰ τὴν καταθέλουσ[αν] --- ὡς ἐπὶ σωτήρα καὶ θελὸν π[α]λινγενεσίαν τοῖς ἀπολωλόσι --- / βλέψαντος καὶ πρὸς ἑαυτὸν ἐλθοῦσ[αν] --- μὴ καταλιπ[ε]ῖν [δ]ειησομένην, πατρ[ω]ν μὲν τῆς οἰκίας αὐτοῦ π[---] / --- δικαιοτάτον ὄν] --- κ[αὶ] ὑπ[α]ρ---α τῆς [Ῥωμαίων] ἡγεμονί[ας] μὴ περιιδ[ε]ῖν [κευ]μένην ἐπ' ἐδάφους ἐσεγ[η]--- / --- εὐεργεσίαις.

Since the inscription describes Augustus as victor over the Cantabri (l.13), its *terminus post quem* must be put at about 24 B.C., and that fits other evidence. 24 B.C. is surely the most likely date for Roman assistance aimed at encouraging restoration work. As for the date of the earthquake itself, we can keep to Eusebius' 27 B.C., though with the usual caution where he is concerned. Eusebius himself (*Hieron. Chron.* 168d) could be creating a doublet when he writes for 5 B.C.: "On the island of Cos, many houses collapsed in an earthquake".

In insula Coo terrae motu plurima conciderunt.

Some manuscripts give *Choo* (reflecting confusion with *Chio*?). However, there is no reason why an earthquake should not have struck both Chios and Cos at the same time.

The earthquake seems, therefore, to have affected an area comprising Lydia, Phrygia and the Aegean (perhaps with its epicentre in the Maeander valley?). As regards Phrygia, it is worth mentioning two passages in Strabo, who died in 19 A.D. At 12.8.16-18 he tells how, in the city of Carura, a whole brothel, with the girls and the brothel keeper, was swallowed up by a gaping hole in the ground (see Guidoboni 1989, p.659); and at 13.4.10 he mentions the frequency with which Philadelphia suffered earthquake damage. Unfortunately, it is not possible to date the first occurrence, and in any case its anecdotal nature casts doubt on it; but since the second passage deals with events in a naturalistic way, Strabo may have been relying on an earlier source.

However, he does not suggest a connection between events in Phrygia and those in Asia Minor in 17 (see entry <079>), which occurred during his lifetime and of which he was well aware, so it is not possible to date the former with any accuracy.

<073> **17 B.C. the Apennines [central Italy?]**

sources Obseq. 71

catalogues Bonito (1691); Abbati (1703); von Hoff (1840); Mallet (1853); Mercalli (1883); Guidoboni (1989)

Obsequens is a late but reliable source, and as in the case of other earthquakes reported by him, it is difficult to establish any background to this one, beyond its date and place. Furthermore, the location of this particular earthquake is especially problematical in that Obsequens refers not to a city or territory, but to a villa belonging to Augustus' wife Livia.

Obsequens tells us that in 17 B.C.: "there was a great earthquake at the foot of the Apennines, at the country house of Livia, wife of Caesar [Augustus]".

Sub Appennino in villa Liviae, uxoris Caesaris, ingenti motu terra intremuit.

We do not know the exact location of Livia's country house in the Apennines, though it may have been the Prima Porta villa on the Via Flaminia, at a spot known as *ad Gallinas albas*.

It is interesting to note that while the prodigy tradition was usually limited to Rome and towns linked to Rome such as colonies or municipia, in Augustan times it was extended to include places which were in some way related to the imperial power. This is a sign that profound religious changes had taken place.

<074> **17 B.C. ●Paphos, ●Cyprus**

sources 1 Dio Cass. 54.23.7; Eus. *Hieron. Chron.* 166c

sources 2 Georg. Sync. 593

catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Ben-Menahem (1979); Guidoboni (1989)

Dio Cassius mentions rebuilding work carried out at Paphos on the island of Cyprus in 15 B.C. at the behest of Augustus: "[Augustus] also set aside money for the inhabitants of Paphos, who had suffered in an earthquake, and issued a decree that the city should be named Augusta".

Παφίους τε σεισμῷ πονήσασι καὶ χρήματα ἐχαρίσατο καὶ τὴν πόλιν Αὔγουσταν καλεῖν κατὰ δόγμα ἐπέτρεψε.

Dio Cassius is a late (3rd century A.D.) but well-informed writer who relies on good sources; and in this case he has thought it worthwhile to record the prompt assistance given by Augustus towards the reconstruction of cities struck by earthquakes. These are by no means disinterested details; for it is well known that in his idealisation of the emperor Augustus, Dio Cassius was trying to describe the contemporary situation and, by implication, draw attention to the problem of public buildings. He wanted to persuade the emperors of his day not to devote too much attention to grandiose public works, leaving municipalities with the all too frequent burden of work such as the rebuilding of a city struck by an earthquake. For a general reference to rebuilding work carried out by Augustus, see the passage from Suetonius (*Aug.* 47) quoted in entry <072>.

That the earthquake was also felt throughout Cyprus, is clear from a reference in the *Chronicon* of Eusebius for the third year of the 190th Olympiad [17 B.C.]: "Large parts

of towns in Cyprus were destroyed in an earthquake”.

In Cypro plurimae civitatum partes terrae motu conciderunt.

Syncellus reports the earthquake in the same terms as Eusebius.

〈075〉 **shortly before 2 B.C. • Naples**

sources Dio Cass. 55.10.9

literature De Caro and Greco (1993)

catalogues Schmidt (1881); Guidoboni (1989)

This is another earthquake recorded thanks to the interest of Dio Cassius, a late writer (3rd century A.D.) who is nevertheless careful and reliable.

In the same year that a temple to Mars Ultor was consecrated in the Forum of Augustus in Rome, the Neapolitans dedicated a sacred athletic contest to the emperor. The official reason for this homage to Augustus was that he had had the city rebuilt after its destruction by earthquake and fire — the latter being perhaps an eruption of Vesuvius.

Dio Cassius reports: “There were celebrations in honour of Mars. A sacred contest was dedicated to Augustus himself in Neapolis, the Campanian city, ostensibly because he had restored it when it was destroyed by earthquake and fire, but in reality because its inhabitants, alone of the Campanians, were trying to imitate the customs of the Greeks as best they could”.

Τῷ μὲν οὖν Ἀρεὶ ταῦτ' ἐγένετο, αὐτῷ δὲ δὴ τῷ Ἀυγούστῳ ἀγὼν τε ἱερὸς ἐν Νέᾳ πόλει τῇ Καμπανίδι, λόγῳ μὲν ὅτι κακωθεῖσαν αὐτὴν καὶ ὑπὸ σεισμοῦ καὶ ὑπὸ πυρὸς ἀνέλαβεν, τὸ δ' ἀληθὲς ἐπειδὴ τὰ τῶν Ἑλλήνων μόνοι τῶν προσχώρων τρόπον τινα ἐξήλουν.

There may be a link between this event and the rebuilding of the city walls by the emperor (De Caro and Greco 1993, p.20).

〈076〉 **5 A.D. Rome**

sources Dio Cass. 55.22.3

literature Boll (1909); Oppolzer (1962)

catalogues Bonito (1691); Schmidt (1881); Guidoboni (1989)

There is a brief reference to this earthquake in Dio Cassius, a late source (3rd century A.D.), but nevertheless an important one for Roman history. As we have already observed (see entry 〈067〉), he still showed a certain interest in prodigies, thereby restoring a certain value to that aspect of paganism.

Dio Cassius records a whole series of extraordinary natural events for the year 5 A.D.: “At this time, during the consulship of Cornelius and Valerius Messalla, violent earthquakes occurred, and the Tiber carried away the bridge and made the city navigable for seven days. There was also a partial eclipse of the sun, and famine set in”.

Τότε δ' οὖν ἐπὶ τε τοῦ Κορνηλίου καὶ ἐπὶ Οὐαλερίου Μεσσάλου ὑπάτων σεισμοὶ τε ἐξαίσιτοι συνέβησαν, καὶ ὁ Τίβερις τὴν τε γέφυραν κατέσυρε τοῦ τε ἡλίου τι ἐκλιπὲς ἐγένετο, καὶ λιμὸς συνηέχθη.

We do not know where the earthquake epicentre was situated, and it is likely that

Rome was simply one of a number of places where tremors were felt. The eclipse of the sun recorded by Dio Cassius occurred on 28 March of that year (Boll 1909, col.2360; Oppolzer 1962, chart 58).

This passage from Dio Cassius is similar to what he writes about the 15 A.D. earthquake (see entry <077>), so one might suspect a doublet; but it is probably no more than a question of a stereotyped expression taken from an annal source or directly from an archive document.

<077> 15 ● Rome

sources Dio Cass. 57.14.7

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Mercalli (1883); Baratta (1892, 1899, 1901); Galli (1906); Carrozzo *et al.* (1973); Guidoboni (1989)

Our knowledge of this earthquake derives solely from a brief reference in Dio Cassius, a late source (3rd century A.D.), but nevertheless an important one for Roman history.

According to Dio Cassius, an earthquake had damaged the walls of Rome: "The river Tiber now flooded a large part of the city, so that people went about in boats, and most people regarded this, too, as an omen, like the violent earthquakes which caused part of the city walls to collapse, and like the frequent thunderbolts which caused wine to leak even from vessels that were sound".

Τοῦ τε ποταμοῦ τοῦ Τιβερίδος πολλά τῆς πόλεως κατασχόντος ὥστε πλευσθῆναι, οἱ μὲν ἄλλοι ἐν τέρατος λόγῳ καὶ τοῦτο, ὥσπερ πού το τε μέγεθος τῶν σεισμῶν ὑφ' ὧν καὶ μέρος τι τοῦ τείχους ἔπεσε.

The walls in question were the Servian walls, built in 378 B.C. (according to Livy) after the Gaulish occupation of 390 B.C. They were repaired on several occasions, the last time before this earthquake being in 87 B.C.

Between the end of republican Rome and the time when Aurelian had walls built (270-275 A.D.), Rome was effectively without a proper surrounding wall, and what walls existed must have been in a state of neglect.

<078> c.17 ● the Reggio Calabria area, ● Sicily

sources Phleg. *FGrHist* 257 F 36 (XIV)

catalogues Bonito (1691); Capocci (1861); Mercalli (1883); Baratta (1901); Carrozzo *et al.* (1973); Guidoboni (1989)

This earthquake is mentioned by Phlegon of Tralles (2nd century A.D.), a freedman of the emperor Hadrian. As we have already pointed out (see entry <060>), he has good sources and is reliable.

A passage in Phlegon of Tralles records that an earthquake struck Sicily and Calabria: "The earthquake also caused damage to many cities in Sicily and to the area around Reggio".

Ἔπαθον δὲ καὶ τῆς Σικελίας ὑπὸ τοῦ σεισμοῦ οὐκ ὀλίγαι πόλεις καὶ τὰ πλησίον Ῥηγίου. ἐσεισθη δὲ οὐκ ὀλίγα καὶ τῶν ἐν Πόντῳ ἐθνῶν.

Phlegon's statement seems to derive from an unidentified "Apollonius grammaticus" who was principally referring to the 17 A.D. earthquake in Asia Minor (see entry <079>).

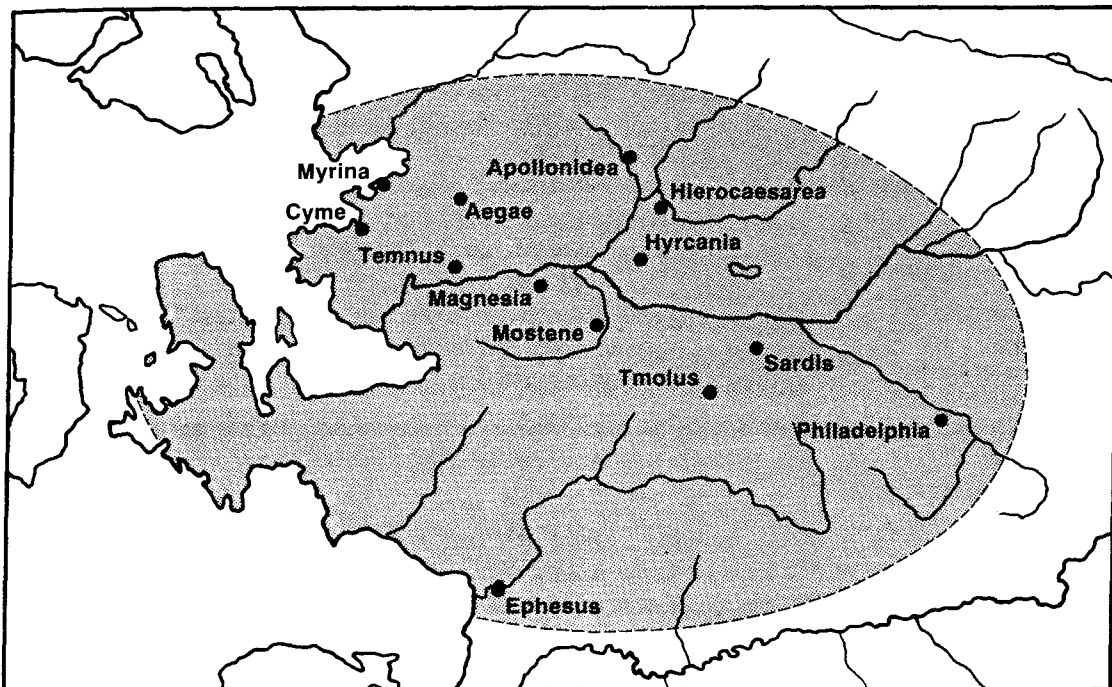
<079> a night in the year 17 ●Aegae, ●Apollonidea, ●Cyme,
 ●Ephesus?, ●Hierocaesarea, ●Hyrkania, ●Magnesia, ●Mostene,
 ●Myrina, ●Philadelphia, ●Sardis, ●Temnus, ●Tmolus
 ▷surface faulting◁

- sources 1 Strabo 12.8.18, 13.3.5, 13.4.8, 13.4.10; Bian. *apud Anthol. Pal.* 9.423; Vell. 2.126; Sen. *NQ* 6.1.13, *ad Luc.* 14.91.9; Plin. *n.h.* 2.200; Apoll. Gramm. *apud Phleg. FGGrHist* 257 F 36 (XIII); Tac. *Ann.* 2.47.1-4; Suet. *Tib.* 48; Dio Cass. 57.17.7
- sources 2 *Orac. Sibyll.* 5.289; Eus. *Hieron.Chron.* 172a; Ioh. Lyd. *De ost.* 53; Sol. 40.5; Georg. Sync. 603; Niceph. Call. 1.17; *Chron.* A 84; *Chron.* B 86-7; Matt. Palm. *Lib. de temp.* 9
- inscriptions *CIL* 3.7096; 10.1624 = *ILS* 156 add.; *SEG* 28.928; *IGR* 4.1514; Foucart (1887)
- coins BMC K90535 D-36 D
- literature Weismantel (1891); Spinazzola (1902); Ambraseys (1971); Robert (1978); Mitchell (1987); *Catalogo epigrafi* (1989); Clementoni (1989); Panessa (1991)
- catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

On an unidentified night in 17 AD., a very violent earthquake struck the Province of Asia. Its effects were disastrous, particularly in Lydia (now part of western Turkey, opposite the Aegean Sea). The most detailed description of what happened and of the measures taken to help the victims, is to be found in the Roman historian Tacitus. He tells us that the city of Sardis suffered the worst damage, followed by Magnesia on Mt. Sipylus, the number of victims being the greater because of outbreaks of fire in the ruins, and because, since the disaster happened at night, those who tried to flee to open ground fell into fissures opened up by the earthquake.

Tacitus writes: "In the same year, twelve important cities in Asia collapsed in an earthquake. It happened at night, with the result that the havoc was the less foreseen and the more devastating. Even the usual resource in these catastrophes of rushing out into the open was unavailing, as the fugitives were swallowed up in yawning chasms. Accounts are given of huge mountains sinking, of former plains seen heaved aloft, and of fires flashing out amid the ruins. As the disaster fell heaviest on the Sardians, it brought them the largest measure of sympathy, the emperor promising ten million sesterces, and exempting them from payments to the national and imperial exchequers for five years. The Magnesians of Sipylus were ranked second as to the extent of their losses and their indemnity. In the case of the Temnians, Philadelphians, Aegeates, Apollonideans, the so-called Mostenians and Hyrcanian Macedonians, and the cities of Hierocaesarea, Myrina, Cyme, and Tmolus, it was decided to exempt them from tribute for the same period and to send a senatorial commissioner to assess the situation on the spot and administer relief. M. Ateius, a former praetor, was chosen for this purpose, because Asia was governed by a former consul, and this avoided problems arising from rivalry between equals".

Eodem anno duodecim celebres Asiae urbes conlapsae nocturno motu terrae, quo improvisior graviorque pestis fuit. Neque solitum in tali casu effugium subveniebat in aperta prorumpendi, quia diductis terris hauriebantur. Sedisse immensos montis, visa in arduo quae plana fuerint, effulsisse inter ruinam ignis memorant. Asperrima in Sardianos lues plurimum in eosdem misericordiae traxit: nam centies sestertium pollicitus Caesar, et quantum aerario aut fisco pendebant, in quinquennium remisit. Magnetes a Sipylo proximi damno ac remedio habiti. Temnios, Philadelphenos, Aegeatas, Apollonidenses, quique Mosteni aut Macedones Hyrcani vocantur, et Hierocaesariam, Myrinam, Cymen, Tmolum levare idem in tempus tributis mittique ex senatu placuit, qui praesentia spectaret refoveretque. Delectus est M. Ateius e praetoriis; ne consulari obtinente Asiam aemulatio inter pares et ex eo impedimentum oreretur.



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Many other Greek and Latin writers record the earthquake, though their descriptions are much briefer than that of Tacitus. Nearest in time to the earthquake was Strabo, and he was also well aware of the seismicity of the region. There are three passages in his work where the earthquake is mentioned. At 12.8.18 he writes: "for even today earthquakes have destroyed Magnesia at the foot of this mountain, when they also destroyed Sardis and the most famous cities in many other areas; but the emperor [Tiberius] had them rebuilt, after granting them tax exemptions".

καὶ γὰρ νῦν τὴν Μαγνησίαν τὴν ὑπ' αὐτῷ κατέβαλον σεισμοί, ἡνίκα καὶ Σάρδεις καὶ τῶν ἄλλων τὰς ἐπιφανεστάτας κατὰ πολλὰ μέρη διελυμήναντο· ἐπηνώρθωσε δ' ὁ ἡγεμὼν, χρήματα ἐπιδούς.

(13.3.5) "It [Magnesia] too was reduced to ruins in the recent earthquakes".

καὶ ταύτην δ' ἐκάκωσαν οἱ νεωστὶ γενομένοι σεισμοί.

(13.4.8) "The city [of Sardis...] recently lost many houses in earthquakes; but the present emperor, Tiberius, generously contributed to the restoration of this and many other cities which had shared the same fate in the same circumstances".

ἡ πόλις [...] νεωστὶ ὑπὸ σεισμῶν ἀπέβαλε πολλὴν τῆς κατοικίας. ἡ δὲ τοῦ Τιβερίου πρόνοια, τοῦ καθ' ἡμᾶς ἡγεμόνος, καὶ ταύτην καὶ τῶν ἄλλων συχνὰς ἀνέλαβε ταῖς εὐεργεσίαις, ὅσαι περὶ τὸν αὐτὸν καιρὸν ἐκοινώνησαν τοῦ αὐτοῦ πάθους.

In the *Palatine Anthology*, there is an epigram by the Bithynian poet Bianor which recalls the tragic fate of Sardis: "Alas, wretched Sardis [...], you were totally overtaken by a single catastrophe when you plunged into a chasm created by an immense split in the earth. Helice and Bura were swamped by the sea; but although you were on dry land, you suffered the same fate as they did in the deep waters".

Σάρδεις [...] νῦν δὴ ὅλαι δύστηνοι ἐς ἓν κακὸν ἀρπασθεῖσαι ἐς βυθὸν ἐξ ἀχανοῦς χάσματος ἠρίπετε. Βοῦρα καθ' ἣ θ' Ἑλίκη κεκλυσμένοι· αἱ δ' ἐνὶ χέρσῳ Σάρδεις ἐμβυθίαις εἰς ἓν ἴκεσθε τέλος.

The power of the earthquake is made clear in Pliny's *Naturalis historia*: "The greatest

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earthquake in human memory occurred when Tiberius Caesar was emperor, for twelve Asian cities were destroyed in a single night".

Maximus terrae memoria mortalium exstitit motus Tiberii Caesaris principatu, XII urbibus Asiae una nocte prostratis.

Seneca also mentions it, not only in his *Naturales Quaestiones*: "Asia Minor lost twelve cities at the same time" (*Asia duodecim urbes simul perdidit*), but also, in passing, in a letter to Lucilius: "How many cities in Asia Minor, [...] were reduced to ruins in a single earthquake?" (*Quotiens Asiae, [...] urbes uno tremore ceciderunt*). Suetonius mentions the help given by the emperor Tiberius. He writes: "Tiberius was not liberal with aid even to the provinces, except in the case of Asia Minor, since the cities there had been destroyed in an earthquake".

Ne provincias quidem liberalitate ulla sublevavit, excepta Asia, disiectis terrae motu civitatibus.

Dio Cassius records also tax exemptions which were granted by the emperor to the damaged cities: "A man of consular rank with five lictors was put in charge of the cities of Asia Minor which had been damaged in an earthquake, and in addition many tax exemptions were granted by Tiberius, as well as generous sums of money".

Ταῖς τε ἐν τῇ Ἀσίᾳ πόλεσι ταῖς ὑπὸ τοῦ σεισμοῦ κακωθείσαις ἀνὴρ ἐστρατηγηκῶς σὺν πέντε ῥαβδούχοις προσετάθη, καὶ χρήματα πολλὰ μὲν ἐκ τῶν φόρων ἀνείθη, πολλὰ δὲ καὶ παρὰ τοῦ Τιβερίου ἐδόθη.

Another anecdote about the earthquake — dating to not long after it occurred — is contained in a fragment from Apollonius Grammaticus (1st century AD) preserved in Phlegon of Tralles (2nd century AD.): "Apollonius Grammaticus tells us that there was an earthquake during the reign of Tiberius Nero, and that many famous cities in Asia were almost totally destroyed. Later on Tiberius rebuilt them at his own expense. Consequently, they built and dedicated to him a colossal statue next to the Temple of Venus in the Roman Forum, and each of the cities subsequently put up statues".

Detail of the marble base forming part of a monument dedicated to Tiberius in 30 or 31 AD., to thank him for bringing aid to towns in Asia Minor which had been struck by earthquakes in 17 and 23 AD. The cities are represented as human figures. The monument may have been repaired because of damage suffered in the earthquake of 62 AD. The base was discovered at Pozzuoli in 1693 (Museo Archeologico Nazionale, Naples, photo Soprintendenze Archeologiche delle Province di Napoli e Caserta).



A coin issued in honour of the emperor Tiberius for his contribution to the rebuilding of towns in Asia Minor damaged in the earthquakes of 17 and 23 A.D.
(British Museum, London, K 90535 D-36 D).



Ἀπολλώνιος δὲ ὁ γραμματικὸς ἱστορεῖ ἐπὶ Τιβερίου Νέρωνος σεισμὸν γεγενῆσθαι καὶ πολλὰς καὶ ὀνομαστάς πόλεις τῆς Ἀσίας ἄρδην ἀφανισθῆναι, ἃς ὕστερον ὁ Τιβέριος οἰκεῖα δαπάνη πάλιν ἀνώρθωσεν. ἀνθ' ὧν κολοσσόν τε αὐτῷ κατασκευάσαντες ἀνέθεσαν παρὰ τῷ τῆς Ἀφροδίτης ἱερῷ, ὃ ἐστὶν ἐν τῇ Ῥωμαίων ἀγορᾷ, καὶ τῶν πόλεων ἐκάστης ἐφεξῆς ἀνδριάντας παρέστησαν.

The generosity shown by Tiberius towards the cities which had suffered in the earthquake was also commemorated in a series of sesterces bearing the image of the emperor himself.

Since the cities damaged in the earthquake were assisted by Tiberius, they erected a monument to him. It was rectangular in shape, and the base was discovered at Pozzuoli in 1693. It bears the following inscription (*CIL* 10.1624 = *ILS* 156 add.), which can be dated to 30 A.D. on the basis of the titles attributed to the emperor: "To Tiberius Caesar Augustus, son of the emperor Augustus, nephew of the emperor Julius, *pontifex maximus*, consul for the fourth time, emperor for the eighth time, granted tribunician power for the thirty-second time, the *Augustales*. The city authority restored [...] Sardis [...], [Magnesia], Philadelphia, Tmolus, Cyme, Temnus, Cibyra, Myrina, Ephesus, Apollonidea, Hyrcania, Mostene, [Aeglae and Hieroc]aesarea".



*Ti(berio) Caesari divi / Augusti f(ilio) divi / Iuli n(epoti) Augusto / pontif(ici) maximo
co(n)s(uli) III / imp(eratori) VIII trib(unicia) potestat(e) XXXII / Augustales / res publica /
restituit. / [---]ihenia Sa[rde]s Vlloron, [Magnes]ia / Philadelphea, Tmolus, Cyme /
Temnos, Cibyra, Myrina, Ephesos, Apollonidea, Hyrcania / Mostene, [Aeg]ae,
[Hieroc]aesarea.*

On the four sides of the base are representations of the cities which were struck by the earthquake: Sardis, Magnesia, Philadelphia, Tmolus, Cyme, Temnus, Cibyra, Myrina, Ephesus, Apollonidea, Hyrcania, Mostene, Aegae and Hierocaesarea. This raises a problem, because Ephesus and Cibyra have to be added to Tacitus' list, giving not twelve but fourteen cities. The problem of Cibyra could be solved in terms of Tacitus' evidence that it was destroyed shortly before 23 A.D. (see entry <080>); and so the base from Pozzuoli could include the thanks of the cities struck by the earthquakes of 23 A.D. as well as 17 A.D. There remains the problem of Ephesus, however, for it does not figure in Tacitus' list of twelve cities. Archaeologists do not yet seem to have found clear traces of an earthquake at Ephesus at this period; and any such evidence would inevitably be limited, because we lack a comprehensive epigraphic and archaeological study of the reconstruction of buildings in the region, such as might lead to a future regional study of the seismicity of western Asia Minor. Given the above considerations, we can formulate at least three possible solutions to the problem:

a) Ephesus as well as Cibyra may have been struck by the earthquake of 23 A.D. (see entry <080>). This may seem the most reasonable solution to the problem, but certain doubts remain; for if there had indeed been an earthquake at Ephesus at that date, why did a careful source like Tacitus fail to mention such an important city? This did not escape the notice of Th. Mommsen in his edition of the inscription in *CIL* 10.1624 (published in 1883). In his opinion, the Ephesus earthquake must have occurred shortly before the Pozzuoli inscription was made: roughly between 28 A.D. and 30 A.D. But the only earthquake we know of dating to about that time is one in Pontus and Bithynia (see entry <082>); and in any case, Mommsen does not support his opinion with convincing evidence.

b) Both Cibyra and Ephesus may have been only partly damaged in 17 A.D., and may have been struck shortly before 23 A.D. by another tremor, which reduced them to such a serious state that tax exemption became necessary.

c) Both Cibyra and Ephesus may have been struck only by the earthquake of 17 A.D., without the damage they suffered being so serious as to cause Tiberius to grant them tax exemption. The two cities may have made a later request to Rome for tax exemption, and this may have been granted in 23 A.D.

A further difficulty lies in the decipherment of the two names which immediately precede and follow Sardis. Spinazzola (1902, p.119ff.) suggests [*Tyr*]renia Sa[rde]s Peloponnesos, referring to the legend according to which Tyrrhenus and Pelops were born at Sardis. He also suggests identifying the boy on the left of the representation of the city as Tyrrhenus, and the variously interpreted object in his left hand as the child Pelops. This difference in the way the name of the city is expressed suggests that the base of the monument was altered, perhaps after the earthquake which accompanied the eruption of Vesuvius in 79 A.D., or that of 62. The Pozzuoli monument was in fact a slightly different and smaller copy of a colossal statue of Tiberius which stood in the Forum of Caesar in Rome, but of which no trace has so far been discovered. There exists a very interesting dedicatory inscription to Tiberius (31-37 A.D.), which describes him as *conditor* of the twelve cities destroyed in the earthquake (*CIL* 3.7096): "[Tiberius Caesar Augustus, son of the emperor Augustus, nephew of the emperor Julius, *pontifex*] *maximus*, granted [...] tribunician power, [c]onsul for the fifth time, founder at one and the same ti[me of the twelve] cities s[truck] by the [e]arthquake".

[*Ti(berius) Caesar divi Augusti filius divi Iuli n(epos) Aug(ustus), p(ontifex) m(aximus), tr(ibunicia) p(otestate) [--- c]o(n)s(ul) v, conditor uno tem[pore xii civitatum t]errae motu ve[xatarum].*

The inscription appears on four fragments of the architrave of a building, whose position has not been identified, in the Turkish town of Nemrud Kalesi (ancient Aegae).

A very similar inscription in Greek (see Foucard 1887, pp.89-90), dating to 34-35 AD, came to light amongst the ruins of the city of Mostene, which was also damaged in the earthquake. The inscription records that Tiberius rebuilt the twelve Asian cities struck by the earthquake of 17 AD, and describes the emperor as κτίστης ἐνὶ καιρῷ δώδεκα πό/λεων (founder at one and the same time of twelve cities) — the same cities as those mentioned by Tacitus.

Another inscription (*SEG* 28.928) records the restoration of a temple at Sardis which had been damaged in an earthquake: “Socrates, son of Polemeus Pardalas, built the temple and dedicated it to Hera. [---] His niece Julia Lydia restored it after the earthquake”.

Σωκράτης Πολεμαίου / Παρδαλᾶς τὸν ναὸν κατεσκεύασεν καὶ τὴν Ἥραν ἀνεθήκεν [---] Ἰουλία Λυδία ἡ ὑωνή / αὐτοῦ μετὰ τὸν σεισμόν / ἐπεσκεύασεν.

And finally, there is an incomplete inscription (*IGR* 4.1514), which records that representatives of the twelve cities struck by the earthquake met at Sardis to discuss ways of expressing their gratitude to Tiberius.

⟨080⟩ **shortly before 23 • Cibyra**

sources 1 Tac. *Ann.* 4.13.1

sources 2 Niceph. *Call.* 1.17

inscriptions *CIL* 10.1624 = *ILS* 156 add.; *IGR* 4.1514

literature Ruge (1921); Panessa (1991)

catalogues Ligorio [1574-7]; Schmidt (1881); Guidoboni (1989)

Tiberius took action in relation not only to the famous earthquake of 17 AD (see entry ⟨079⟩), but also to another which struck the city of Cibyra in the province of Asia a few years later. Tacitus records the following measures taken by Tiberius in the year 23 AD: “He got the senate to issue decrees exempting the city of Cibyra in Asia and Aegium in Achaia from taxes for three years, because they had suffered severe earthquake damage”.

Factaque auctore eo senatus consulta ut civitati Cibyriticae apud Asiam, Aegiensi apud Achaïam, motu terrae labefactis, subveniretur remissione tributi in triennium.

For Aegium, see entry ⟨081⟩. On the Pozzuoli statue base (*CIL* 10.1624 = *ILS* 156 add.), already mentioned in entry ⟨079⟩, the name Cibyra appears along with those of other cities in Asia which were damaged in the 17 AD earthquake. See also inscription *IGR* 4.1514, from Sardis, where a representative of Cibyra is mentioned amongst those of cities in Asia which can be identified as the ones struck by the 17 AD earthquake. The city must have been rebuilt within the space of two years, because we know from coins that the era of Cibyra began in 25 AD (Ruge 1921, col.376).

In view of Tacitus' accuracy and the fact that he had access to official documents, there is no reason to doubt that the city of Cibyra was so badly damaged by another earthquake that the emperor felt justified in granting tax exemption. As we have already seen, however, that does not explain why the city of Cibyra is included in the list on the base from Pozzuoli in honour of Tiberius. For suggested solutions to this problem, see entry ⟨079⟩ above.

<081> **23 •Aegium, Patras**

sources Sen. *NQ* 6.25.4; Tac. *Ann.* 4.13.1

catalogues Ligorio [1574-7]; Galanopoulos (1961); Shebalin *et al.* (1974);
Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

Tacitus refers to tax exemption granted by Tiberius for the year 23 AD, after Aegium had been struck by an earthquake: "He got the senate to issue decrees exempting the city of Cibyra in Asia and Aegium in Achaia from taxes for three years, because they had suffered severe earthquake damage".

Factaque auctore eo senatus consulta ut civitati Cibyraticae apud Asiam, Aegiensi apud Achaia, motu terrae labefactis, subveniretur remissione tributi in triennium.

Aegium was a Peloponnese port at the mouth of the river Selinus.

It is very likely that this is the same earthquake mentioned by Seneca, who draws attention to the fact that when the tremor struck Aegium, it was not felt in nearby Patras: "How strange [...] that when Aegium was struck, the nearby city of Patras only knew of it by report".

Quid dicam [...] cum laboravit Aegium, tam propinquas illi Patras de motu audisse?

<082> **24 November 29 •Nicea, •Bithynia, Pontus**

sources 1 Apollon. Gramm. *apud* Phleg. *FGrHist* 257 F 36 (xiv); Phleg. *FGrHist* 257 F 16 a

sources 2 Eus. *Hieron. Chron.* 174d; Oros. *Hist.* 7.4.13; Mal. 241; *Chron. Pasch.* 219-222, 412, 417;

Georg. Sync. 614

literature Boll (1909)

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853);

Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

This earthquake in 29 AD is recorded in a fragment by Phlegon: "In accordance with the prophecies which had been made about Him, Jesus Christ came to the Passion in the eighteenth year of the reign of Tiberius, at which time we also find in the memoirs of other peoples these very words: 'There was an eclipse of the sun, Bithynia was shaken by an earthquake, and many buildings collapsed in the city of Nicea'; and all these things correspond to what happened during the Passion of the Saviour". Phlegon also writes about these things [...] as follows: 'In the fourth year of the two hundred and second Olympiad [32/33 AD] there was a great eclipse of the sun which exceeded all previous eclipses; at the sixth hour [3 p.m.] day turned into such dark night that the stars could be seen in the sky, and an earthquake in Bithynia destroyed many buildings in the city of Nicea'".

Iesus Christus secundum prophetias quae de eo fuerant praelocutae ad passionem venit anno Tiberii decimo octavo, quo tempore etiam in aliis ethnicorum commentariis haec ad verbum scripta repperimus "solis facta defectio, Bithynia terrae motu concussa, et in urbe Nicaea aedes plurimae corruerunt", quae omnia his congruunt quae in passione Salvatoris acciderant. Scribit vero super his et Flego, qui [...] ita dicens: "quarto autem anno ducentesima secundae magna et excellens inter omnes quae ante eam acciderant defectio solis facta; dies hora sexta ita in tenebrosam noctem versus ut stellae in caelo visae sint terraeque motus in Bithynia Nicae[n]ae urbis multas aedes subverterit".

Boll (1909) was able to provide the correct date for this earthquake as 29 AD, by relating it to the solar eclipse mentioned in the sources.

Apollonius Grammaticus, who was Phlegon's source, records an earthquake in Pontus at the time of Tiberius. In a fragment quoted by Phlegon we read: "serious earth-

quake damage also occurred amongst the peoples who lived in Pontus”.

Ἐσείσθη δὲ οὐκ ὀλίγα καὶ τῶν ἐν Πόντῳ ἔθνῳν.

The Phlegon fragment mentions the discovery of enormous skeletons, from which a tooth was sent to Tiberius. He gave it for examination to a certain Pulchrus, who was probably a naturalist. It seems likely that this is the same earthquake that struck Bithynia.

The Bithynia earthquake is also referred to in Eusebius, while Orosius relates it to the one which Christian tradition associates with the death of Christ (Matth. 27.50-4, 28.1-2). Thanks partly to the popularity of Eusebius' *Chronicon*, the earthquake is frequently mentioned in Byzantine chronicles. Malalas, for example, refers to it as a tremor which shook the whole world.

<083> a few days before 16 March 37 ● Capri

sources Suet. *Tib.* 74.2

literature De Caro and Greco (1993)

catalogues Manetti [1457]; Schmidt (1881); Mercalli (1883); Baratta (1901); Carrozzo *et al.* (1973); Guidoboni (1989)

Our knowledge of this earthquake comes from Suetonius, a 2nd century AD. writer who is acknowledged to be a careful recorder of small details for use in his biographies of the Caesars.

This earthquake caused the collapse of the Capri lighthouse, and is included in a list of prodigies which Suetonius links to the death of Tiberius on 16 March 37 AD: “A few days before he died, the tower of the Capri lighthouse collapsed in an earthquake. And at Misenum, ashes and embers which had been brought in to heat his dining-room and were long since extinguished and cold, suddenly flared up again in the early evening and continued to glow uninterruptedly for much of the night”.

Et ante paucos quam obiret dies, turris Phari terrae motu Capreis concidit. Ac Miseni cinis e favilla et carbonibus ad calficiendum triclinium inlatis, extinctus iam et diu frigidus, exarsit repente prima vespera atque in multam noctem pertinaciter luxit.

<084> the morning of 23 March 37 ● Antioch, ● Daphne

sources Mal. 243

literature Schenk von Stauffenberg (1931)

catalogues Sieberg (1932 a); Amiran (1950-51); Guidoboni (1989)

Malalas records an earthquake at Antioch: “During the first year of his reign [that of Caligula], Antioch the Great suffered the effects of divine wrath for the second time since the arrival of the Macedonians. It happened on 23 Dystrus, that is to say March, in the eighty-fifth year of the era of Antioch, early in the morning. The Daphne area was also damaged, and Gaius [Caligula] gave a great deal of money to the city and its surviving inhabitants”.

Ἐν δὲ τῷ πρώτῳ ἔτει τῆς βασιλείας αὐτοῦ ἔπαθεν ὑπὸ θεομηνίας Ἀντιόχεια ἡ μεγάλη μηνὶ δύστρῳ τῷ καὶ μαρτίῳ κγ' περὶ τὸ αὖγος τὸ δεύτερον αὐτῆς πάθος τοῦτο τὸ μετὰ τοὺς Μακεδόνας, ἔτους χρηματίζοντος πε' κατὰ τοὺς Ἀντιοχεῖς. ἔπαθε δὲ καὶ μέρος Δάφνης· καὶ πολλὰ χρήματα παρέσχεν ὁ βασιλεὺς Γαίος τῇ αὐτῇ πόλει καὶ τοῖς ζήσασι πολίταις.

〈085〉 **c.47 •Antioch**

- sources 1 Philostr. *V. Apo* 6.38; Mal. 246
sources 2 Georg. Sync. 632
literature Downey (1961)
catalogues Schmidt (1881); Sieberg (1932 a); Guidoboni (1989)

In his *Life of Apollonius*, Philostratus mentions an earthquake at Antioch: "The ruler of Syria had plunged Antioch into a feud, by disseminating among the citizens suspicions such that when they met in assembly they all quarrelled with one another. But when a violent earthquake occurred, they all cowered in fear and, as is usual in the case of heavenly portents, prayed to one another".

Στασιάζοντος δὲ τὴν Ἀντιόχειαν τοῦ τῆς Συρίας ἄρχοντος καὶ καθιέντος ἐς αὐτοὺς ὑποψίας, ὑφ' ὧν διειστήκεσαν ἐκκλησιαζομένη πόλις, σεισμοῦ δὲ γενναίου προσπεσόντος, ἔπηξαν καὶ ὅπερ ἐν διοσημίαις εἶωθεν, ὑπὲρ ἀλλήλων ηὔξαντο.

The *Life of Apollonius of Tyana* by Philostratus is a work which can present problems of interpretation when used as a historical source. In this case, however, the information he provides can be accepted with greater confidence, because there is another source in Malalas who, although a late writer (6th century AD.), is of fundamental importance; and where events in Antioch and Syria are concerned, he was using primary sources — probably the Antioch city chronicles.

Malalas records an earthquake at Antioch during the reign of Claudius for a date that can be established as about 47 AD.: "The great city of Antioch was also shaken by an earthquake at that time. Cracks appeared in the temples of Artemis, Ares and Heracles, and famous palaces collapsed as well. The emperor Claudius himself waived the tax which was normally paid by his Antiochene subjects, for the reconstruction of the arcades which had been built in the time of Tiberius Caesar".

Ἐσείσθη δὲ τότε καὶ ἡ μεγάλη Ἀντιόχεια πόλις, καὶ διερράγη ὁ ναὸς τῆς Ἀρτέμιδος καὶ τοῦ Ἄρεως καὶ τοῦ Ἡρακλέος καὶ οἵκοι φανεροὶ ἔπεσαν. ὁ δὲ αὐτὸς βασιλεὺς Κλαύδιος ἐκούφισεν ἀπὸ τῶν συνεργιῶν, ἥτοι συστημάτων, τῆς Ἀντιοχέων πόλεως τῆς Συρίας τὴν λειτουργίαν ἣν παρείχον ὑπὲρ καπνοῦ, εἰς ἀνανέωσιν τῶν ὑπορόφων ἐμβόλων αὐτῆς τῶν κτισθέντων ὑπὸ Τιβερίου Καίσαρος.

〈086〉 **c.47 •Ephesus, •Hierapolis (Phrygia), •Laodicea (Phrygia), •Miletus, •Smyrna, •the island of Chios, the island of Delos, •the island of Samos, Ionia**

- sources 1 Mucian. *apud* Plin. *n.h.* 4.66; Philostr. *V. Apo* 4.6; Georg. Sync. 632
sources 2 Mal. 246
inscriptions Schede (1912) = *AE* 1912, 216; Freis (1985); *Inschr. Didyma* 149
literature Schenk von Stauffenberg (1931); Habicht (1960); Robert (1978); Ritti (1985); Traina (1987)
catalogues Shebalin *et al.* (1974); Guidoboni (1989)

There is epigraphic evidence for an earthquake in the Aegean region about 47 AD. That the earthquake struck Samos is also confirmed by two inscriptions, one in Latin and one in Greek, but identical in content. The first of these was found on the island of Samos (Schede 1912, pp.217-8) and records the rebuilding of the temple of Liberius by the Emperor Claudius (*AE* 1912, 216): "Tiberius Claudius Caesar Augustus Germanicus, *pontifex maximus*, granted tribunician power for the seventh time, emperor for the fifteenth time, consul for the fourth time, father of the nation, *ensor*, [rebuilt] the temple of Liber Pater, [which had collapsed] through age and because of an earthquake".

Ti(berius) Claudius Caesar Aug(ustus) / Germanicus, pontifex / maximus, tribuniciae / potestatis vii, imp(erator) xv, co(n)s(ul) iii, / pater patriae, censor, aedem Liberi Patris / vetustate et terrae motu [conlapsam restituit].

The second inscription is in Greek (Freis 1985): "Tiberius Claudius Caesar Augustus Germanicus, *pontifex maximus*, in the seventh year of his tribunician power, in the fifteenth year of his imperial power, in his fourth year as consul, father of the nation, *censor*, rebuilt the temple of Dionysus, which had been reduced to ruins through age and because of an earthquake".

Τιβέριος Κλαύδιος / Καῖσαρ Σεβαστὸς / Γερμανικὸς ἀρχιερεὺς / μέγιστος [δημαρχικῆς] / ἐξουσίᾳς τὸ ἑβδομον/ αὐτοκράτωρ/ τὸ πεντεκαίδεκατον/ ὑπατος [τὸ τέταρτον/ πατὴρ [πατρίδος] / τειμητή[ς, τὸν ναὸν/ τοῦ Διόνυσου] / [ἀρχαιότητι καὶ] / [σεισμῷ γενομένῳ] / [κατεφθαρμένον] / [ἀποκατέστησε].

Habicht (1960) has identified some indirect evidence of damage at Miletus from the 47 AD earthquake (the literary sources have nothing to say on the matter) in the inscription in honour of Gnaeus Vergilius Capito, *epitropos* of Claudius, found in the sanctuary of Apollo Didymaeus (*Inscr. Didyma* 149) and dated to 52-54 AD.

Miletus can apparently be identified as one of the unnamed cities mentioned by Malalas in addition to Ephesus and Smyrna; and since it is near both these cities as well as Samos, the damage at Miletus may well have been on such a scale that the rebuilding work organised by Capito led the city to proclaim him *evergetes* ("great benefactor").

Further information as to the location of the earthquake can be obtained from literary texts. Pliny (*n.h.* 4.66) mentions evidence from Licinius Mucianus, to the effect that Delos was struck by earthquakes at least twice, although it was supposed to be exempt from them because of its "purity". *Mucianus prodidit bis concussam*. Whereas the first earthquake could have been the one mentioned by Thucydides (or Herodotus?) See the discussion in entries <004> and <011> above) the second earthquake may have been experienced by Mucianus personally, since he was in the province of Asia during the reign of Claudius (Traina 1987).

We can also relate this earthquake to the one mentioned by Philostratus in his *Life of Apollonius*. Philostratus refers to Apollonius' own prophecy about future earthquakes in Ionia, specifically mentioning the cities of Smyrna and Miletus, and the islands of Chios and Samos: "[Apollonius said:] 'O ye gods, who are patrons of the Ionians, grant that this fair colony may enjoy safety at sea, and that no disaster from the sea may fall on their land, and that Aegeon, the author of earthquakes, may never shake their cities to destruction'. These words he uttered under divine impulse, because he foresaw, as I believe, the disasters which afterwards overtook Smyrna and Miletus and Chios and Samos and many places in Ionia".

“ὦ θεοι” εἶπεν “Ἰόνων ἡγεμόνες, δοίητε τῇ καλῇ ἀποικίᾳ ταύτῃ ἀσφαλεῖ χρῆσθαι καὶ μηδὲν τῇ γῇ κακὸν ἐξ αὐτῆς προσκωμάσαι, μηδ’ Αἰγαίωνα σεισίχθονα τινάξαι ποτὲ τὰς πόλεις.” τοιαῦτα ἐπεθείαξε προορῶν, οἶμαι, τὰ χρόνοις ὕστερον περὶ τε Σμύρναν περὶ τε Μίλητον περὶ τε Χίον καὶ Σάμον καὶ πολλὰς τῶν Ἰάδων ξυμβάντα.

The event was recorded by Byzantine chroniclers, who focus attention on the damage it caused in the cities of Asia Minor. Malalas tells of Claudius' rebuilding of "Ephesus, Smyrna and many other cities in Asia Minor", while Syncellus adds two cities in Phrygia as well as other cities in Asia and an "Antioch": "Laodicea and Hierapolis in Asia Minor as well, in addition to Antioch and other cities, were badly shaken by the earthquake".

Τότε καὶ Λαοδίκεια καὶ Ἱεράπολις τῆς Ἀσίας καὶ ἄλλαι πόλεις, Ἀντιόχεια τε κατεσεισθήσαν.

It is difficult to evaluate the last text. Syncellus in fact mentions an earthquake at Hierapolis, Laodicea and Colossae for AD. 53 (see Ritti 1985, p.27). The other event is perhaps to be linked to the earthquake of c.60 AD. (see entry <092>). We thus have two distinct earthquakes: the first, in the context of Syncellus' work, can be dated to about 50 AD. (see Ritti 1985, p. 27). Yet we know that the Antioch earthquake happened about 47 (see entry <085>). Now Syncellus is a very late author, but we know that he used the original edition of Eusebius' *Chronicon*, though we must treat his dating of the earthquake with caution. Nevertheless, it is always possible that both Laodicea and Hierapolis were struck by an earthquake on two different occasions.

<087> **c.mid-1st century Philippi**

sources *TN Acta* 16.26

catalogues Bonito (1691); Mallet (1853); Capelle (1924); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

The Acts of the Apostles mention an earthquake at Philippi, where Paul and Silas were in prison: "suddenly there was such a violent earthquake that the foundations of the jail were shaken; all the doors burst open".

Ἄφνω δὲ σεισμὸς ἐγένετο μέγας, ὥστε σαλευθῆναι τὰ θεμέλια τοῦ δεσμοτηρίου. ἠνεώχθησαν δὲ παρακρήμα αἱ θύραι πάσαι, καὶ πάντων τὰ δεσμὰ ἀνέθη.

The episode has to be treated with great caution, of course, but is included in this catalogue because of its important position in the Christian tradition: see, for example, Raphael's tapestry cartoon in the Vatican Galleries.

<088> **c.mid-1st century the Hellespont**

sources Philostr. *V. Apo* 6.41

catalogues von Hoff (1840); Schmidt (1881); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

Like the other earthquakes mentioned in Philostratus' *Life of Apollonius of Tyana*, this one also deserves consideration, though the nature of the source prevents us from reaching firm conclusions about it — not so much because he is a late source (3rd century AD.), for many ancient earthquakes are recorded by sources which are accurate and reliable in spite of being much later than Philostratus, but rather because his narrative lies half way between history and pagan hagiography.

Philostratus mentions a series of financial frauds carried out at the expense of earthquake victims along the northern shore of the Hellespont: "At one time the cities on the north side of the Hellespont were struck by earthquakes, and Egyptians and Chaldeans went begging about through them to collect money, pretending that they needed ten talents to offer sacrifices to Earth and Poseidon. And the cities began to contribute under the stress of fear, partly out of their common funds and partly from private sources. But the impostors refused to offer the sacrifices on behalf of their dupes unless the money was deposited in the banks. Now the sage determined not to allow the peoples of the Hellespont to be imposed upon; so he visited their cities, and drove out the fraudsters who were making money from the misfortunes of others, and then he identified the causes of the supernatural wrath, and by making such offerings as suited each case he averted the visitation at small cost, and the land was at rest".

Σεισμῶν δὲ κατασχόντων ποτὲ τὰς ἐν τῷ ἀριστερῷ Ἑλλησπόντῳ πόλεις, Αἰγύπτιοι μὲν καὶ Χαλδαῖοι περὶ αὐτὰς ἠγείροντο ὑπὲρ ξυλλογῆς χρημάτων, ὥς δεκαταλάντους

θυσίας Γῆ καὶ Ποσειδῶνι θύσοντες, ξυνέφερον δ' αἱ πόλεις τὰ μὲν ἀπὸ τοῦ κοινοῦ, τὰ δὲ ἀπὸ τῶν οἴκων ὑποκείμενοι τῷ φόβῳ, οἱ δὲ, εἰ μὴ ἐπὶ τραπεζῶν ἐκτεθείη τὸ ἀργύριον, οὐκ ἂν ἔφασαν ὑπὲρ αὐτῶν θῦσαι· δοκεῖ δὴ τῷ ἀνδρὶ μὴ περιδεῖν τοὺς Ἑλλησποντίους· καὶ παρελθὼν ἐς τὰς πόλεις τοὺς μὲν ἀπήλασεν ὡς θησαυρὸν πεποιημένους τὰ ἐτέρων κακά, τὰς δὲ αἰτίας τῶν μηνιμάτων ξυλλαβὼν καὶ ὡς ἐκάστη πρόσφορον θύσας, ἀπεύξατο τὴν προσβολὴν δαπάνη σμικρᾷ, καὶ ἡ γῆ ἔστη.

{089} 51 • Rome

sources Tac. *Ann.* 12.43.1; Dio Cass. 61.33.2 c *apud* Zon. 11.10

inscriptions Panciera (1980); *AE* 1980, 5

literature Panciera (1980); *Catalogo epigrafi* (1989); Molin and Guidoboni (1989)

catalogues Bonito (1691); Abbati (1703); Schmidt (1881); Mercalli (1883); Guidoboni (1989)

This is the first earthquake in Rome for which we have epigraphic as well as literary evidence. At the year 51 Tacitus records: "There were many prodigies in that year. Birds of ill omen settled on the Capitol, houses collapsed as a result of frequent earthquakes, and as fear spread, the weak were trampled underfoot by the crowds in panic".

Multa eo anno prodigia evenere. Insessum diris avibus Capitolium, crebris terrae motibus prorutae domus, ac dum latius metuitur trepidatione vulgi invalidus quisque obtriti.

Dio Cassius relates this same event to the ceremony of Nero's putting on the *toga virilis*. This ceremony indicated that the emperor had reached adulthood and was entitled to take part in public life; and since the senate was opposed to him, it considered the occasion a misfortune. Of the occasion, Dio Cassius wrote: "the Divine Power shook the earth for a long time on the very day of the ceremony and by night struck terror into the hearts of all alike".

Κατὰ τὴν ἡμέραν ἐν ᾗ ἐνεγράφη τὸ δαιμόνιον τὴν τε γῆν ἐπὶ πολὺ ἔσεισε καὶ φόβον νυκτὸς πᾶσιν ὁμοίως ἐνέβαλε.

This is another case where Dio Cassius' source (perhaps the *Acta senatus*, that is to say the senate archives which Tacitus and Suetonius also consulted) stresses the nature of the earthquake as a prodigy.

The versions of the two historians agree that fairly serious damage was caused, and that the general panic resulted in a number of victims as well.

There may well be a reference to this earthquake in an inscription (unfortunately defective) which was made on the occasion of the restoration of a shrine which had been set up only a few years earlier (Panciera 1980):

a. "[To Tiberius Claudius] Caesar Augustus Germanicus, son of Drusus, *pontifex maximus*, [and to the Lares] of the emperor. [The *magistri* of the *collegium*] for that year donated, at their own expense, to the decuria and the Collegium Augustianum Maius the marble shrine as it is: [---] slave of Augustus called Julianus, attendant, Marcus Livius Tanais, freedman of a freedman of the empress, [--- At]talus?, Tiberius Claudius Soterichus, freedman of the emperor, Tiberius Julius Olympicus, *quaestor* (elected by the decurions, or elected when he was already a decurion), [Tiberius Julius Daphnus, decur]ion. Consecration took place on the Calends of August during the consulship of Cnaeus Hosidius Geta and Titus Flavius Sabinus".

[Ti(berio) Claudio] Drusi f(ilio) Caisari Augusto Germanico, pontif(ici) maxim(o), / [et Larib]us Domnicis decuriae et collegio Augustiano Maiori, / [mag(istri) coll(egi)] huius

anni d(e) s(ua) p(ecunia) d(ono) d(ederunt) aediculam marmoratam ita uti est: / [---] Aug(usti) (scil. servus) Iulianus pediseq(uus), M(arcus) Livius Augustae liberti libertus Tanais, / [---] At[?]talus, Ti(berius) Claudius Aug(usti) l(ibertus) Soterichus, Ti(berius) Iulius Olympicus, q(uaestor) prim(us) factus ex decurion(---), / [Ti(berius) Iulius Daphnus decur(io); dedicatum k(alendis) Aug(ustis) Cn(aeus) Hosidius Geta T(ito) Flavio Sabino co(n)s(ulibus).

b. "[To Tiberius Claudius Caesar Augustus Germanicus, *pontifex maximus*, [and to the Lares of the emperor. The *magistri* of the *collegium* for this year] donated, at their own expense, [to the decuria and the C]ollegium Augustianum Maius Castrense the marble shrine as it is: [--- slave of Augustus called Julianus, attendant, T]iberius Claudius Soterichus, imperial freedman, [Marcus Livius Tanais, freedman of a freedman of the empress T]iberius Julius Olympicus, *quaestor* (elected by the decurions, or elected when he was already a decurion), [--- Attalus?, Tiberius J]ulius Daphnus, decurion. Consecration took place on the Calends of August during the consulship of Cnaeus Hosidius Geta and Titus Flavius Sabinus. [--- and Ju]lia Saturnina, daughter of Olympicus, arranged the [rebuilding] of the shrine [which was destroyed by the force of an earthquake] and dedicated it [on the Calends of August during the consulship of Faustus Cornelius Sulla Felix and Q.]ulius Barea Soranus".

[Ti(berio) Claudio Caisari Augu]sto German(ico), pontif(ici) maxim(o), / [Larib(us) Domnic(is) decur(iae) et c]ollegio Augustiano Maiori cast(rensi) / [mag(istri) coll(egi) huius anni] d(e) s(ua) p(ecunia) d(ono) d(ederunt) aediculam marm(oratam) ita ut est: / [--- Aug(usti) (scil. servus) Iulianus pediseq(uus), T]i(berius) Claudius Aug(usti) l(ibertus) Soterichus, / [M(arcus) Livius Augustae liberti lib(ertus) Tanais, T]i(berius) Iulius Olympicus q(uaestor) primus fact(us) ex decurion(---), / [--- Attalus?, Ti(berius) I]ulius Daphnus d(ecurio); dedic(atum) kal(endis) Aug(ustis) Hosid(io) Geta, Flavio Sabino co(n)s(ulibus). / [--- Iu]lia Olympici f(ilia) Saturnina aedicul(am) / [vi terrae motus dilapsam, reficiu]nd(am) de s(ua) p(ecunia) curaverunt isdem dedicarunt / [kal(endis) Aug(ustis) Sulla Felice Ma]rcio Barea Soran[co co(n)s(ulibus)].

Panciera (1980) suggests solving the problem at the end of line 5 in a. and b. with *ex decurion(ibus)* or *ex decurion(e)*.

Another fragment, preserved in the stacks of the Palazzo delle Esposizioni (box 180), has been published by Panciera (1980, pp.207-9, no.11), and makes it possible to fill in gaps in the second of the two texts (b). The two were discovered in 1940 during work on the underground railway at Viale Aventino, near the Circus Maximus, and recorded the building and dedication of a marble shrine by the *magistri* of the *Collegium Augustianum Maius Castrense*.

The discovery of the new fragment has shown that (a) is the older of the two texts and relates to the original building of the shrine. Text (b) is of later date, and thus not only repeats text (a) (though with a different arrangement of lines), but also records the rebuilding of the *aedes* either eight or five years after it was first erected, that is to say in 52 AD. In view of the very brief time gap involved, and the fact that Tacitus and Dio Cassius record an earthquake in Rome in 51 AD, it must have been that earthquake which caused the collapse of the shrine and led to its being rebuilt. This justifies the restored wording at line 8 of text (b). (For the relevant bibliography, see *Catalogo epigraphi* 1989, pp.140-1, notes 1-2).

〈090〉 53 ● Apamea (Phrygia)

sources Tac. Ann. 12.58.2

catalogues Bonito (1691); Schmidt (1881); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

Tacitus mentions that Apamea, in Phrygia, was granted tax exemption after an earthquake there: "A five year tax exemption was granted to the people of Apamea, because they had suffered severely in an earthquake".

Tributumque Apamensibus terrae motu convulsis in quinquennium remissum.

<091> **53/62/66 • Cnossus, Leben, • Crete**

▷ **emergence of an island, seismic sea-wave** ◁

sources 1 Philostr. *V. Apo* 4.34; Dictys *FGrHist* 49 T 4.3; Mal. 250

sources 2 *Suidas* under *Diktes*; Zon. *Lexicon* under *Diktes*

literature Schenk von Stauffenberg (1931); Di Vita (1979-80 [but 1986]); Henry (1982); Panessa (1991)

catalogues von Hoff (1840); Schmidt (1881); Sieberg (1932 a); Galanopoulos (1960); Galanopoulos (1961); Ambraseys (1962 b); Hermann (1962); Comninakis and Papazachos (1982); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

In a passage in his *Life of Apollonius*, the date of which is much debated, Flavius Philostratus writes that while Apollonius was at Leben, an earthquake struck the island of Crete and the sea receded from the coast. A few days later, news arrived that at the very time of the earthquake, an island had emerged from the sea between Crete and Thera: "They say that the temple is called that of Leben because a promontory juts out from it in the shape of a lion, for it often happens that a group of rocks suggests an animal form, and they say of this promontory that it was once one of the lions yoked to the chariot of Rhea. Here Apollonius was once, about midday, addressing a large number of people who were worshipping at the shrine, when an earthquake shook the whole of Crete, and a roar of thunder was heard to issue not from the clouds but from the earth, and the sea receded about seven stades. Most of the people were afraid that by receding in this way the sea would drag the temple after it, and so carry them away as well, but Apollonius said: 'Take courage, for the sea has given birth to land'. Some thought that he was referring to the harmony of the elements, and suggesting that the sea would not harm the land, but a few days later some travellers arrived from Cydoniatis and announced that on the very day on which this portent occurred and just at the same hour of midday, an island rose out of the sea in the firth between Thera and Crete".

Λεβenaίον δὲ τὸ ἱερὸν ὠνομάσθαι φασίν, ἐπειδὴ ἀκρωτήριον ἐξ αὐτοῦ κατατείνει λέοντι εἰκασμένον, οἷα πολλὰ αἱ ξυντυχίαι τῶν πετρῶν ἀποφαίνουσι, μῦθόν τε ἐπὶ τῷ ἀκρωτηρίῳ ἄδουσιν, ὡς λέων εἰς οὗτος γένοιτο τῶν ὑποζυγίων ποτὲ τῇ Ῥέᾳ. ἐνταῦθα διαλεγόμενου ποτὲ τοῦ Ἀπολλωνίου περὶ μεσημβρίαν, διελέγετο δὲ πολλοῖς ἀνδράσιν, ὑφ' ὧν τὸ ἱερὸν ἐθεραπεύετο, σεισμὸς ἀθρόως τῇ Κρήτῃ προσέβαλε, βροντὴ δὲ οὐκ ἐκ νεφῶν, ἀλλ' ἐκ τῆς γῆς ὑπήχησεν, ἡ θάλαττα δὲ ὑπενόστησε στάδια ἴσως ἑπτὰ. καὶ οἱ μὲν πολλοὶ ἔδεισαν, μὴ τὸ πέλαγος ὑποχωρήσας ἐπισπάσῃται τὸ ἱερὸν καὶ ἀπενεχθῶσιν, ὁ δὲ Ἀπολλώνιος "θαρσεῖτε", ἔφη· "ἡ γὰρ θάλαττα γῆν ἔτεκε". καὶ οἱ μὲν ᾤοντο τὴν ὁμόνοιαν τῶν στοιχείων λέγειν, καὶ ὅτι μὴδὲν ἂν ἡ θάλαττα νεώτερον ἐς τὴν γῆν ἐργάσαιτο. μετὰ δὲ ἡμέρας ὀλίγας ἀφικόμενοί τινες ἐκ τῆς Κυδωνιάτιδος ἠγγείλαν, ὅτι κατὰ τὴν ἡμέραν τε καὶ μεσημβρίαν, ἣν ἐγένετο ἡ διοσημία, νῆσος ἐκ τῆς θαλάττης ἀνεδόθη περὶ τὸν πορθμὸν τὸν διαρρέοντα Θήραν τε καὶ Κρήτη.

This earthquake has traditionally been dated to 46 A.D. (see, for example, the earlier bibliography in Di Vita (1979-80, but [1986], p.436, note 3). That dating was also accepted in Guidoboni (1989, pp.661-2) and is still supported by Panessa (1991, p.346). But the most recent historical, archaeological and seismological studies tend to date it to 62 or 66 A.D. Internal chronological evidence in Philostratus' work makes it unlikely

that Apollonius was in Crete in 46 AD. In fact, Philostratus explicitly states that Apollonius was in the Isthmus of Corinth about 60-61, that is to say "seven years" before Nero began work on rebuilding the canal at the beginning of 67 AD. In 61, Apollonius went to Olympia to see the games, and he spent the following winter in Sparta. He probably left for Crete in early 62, and the earthquake may have occurred in that year. Unfortunately, Philostratus does not tell us how long Apollonius stayed in Crete before leaving for Rome; but he was certainly in Rome in 66, since mention is made of C. Cocceius Telesinus, who was consul in that year.

There are probably two other references to the earthquake described by Philostratus, but unfortunately they, too, present considerable problems of chronology. According to L. Septimius, who translated Dictys Cretensis into Latin, there was an earthquake in the thirteenth year of Nero's reign (i.e. 66) which struck Cnossus and broke open many tombs: "Later on, in the thirteenth year of the reign of Nero, there were earthquakes at the city of Cnossus which opened many tombs, including that of Dictys, with the result that passers-by saw a casket".

Verum secutis temporibus, tertio decimo anno Neronis imperii, in Gnosso civitate terrae motus facti cum multa, tum etiam sepulchrum Dictys ita patefecerunt, ut a transeuntibus arcula viseretur.

Malalas, too, records an earthquake in Crete, and dates it to the thirteenth year of the reign of Claudius (i.e. 53): "In the thirteenth year of the reign of Claudius Caesar, the entire island of Crete suffered from the wrath of God [...] Claudius died, having given generously to Crete for rebuilding".

Τῷ δὲ ἔτει τῆς βασιλείας τοῦ αὐτοῦ Κλαυδίου Καίσαρος ἔπαθεν ὑπὸ θεομηνίας ἡ Κρήτη νήσος πᾶσα [...] καὶ ἐτελεύτα ὁ Κλαύδιος πολλὰ ἐν τῇ Κρήτῃ χαρισάμενος εἰς ἐπανόρθωσιν.

The lexicons (whose source is probably Malalas, anyway) confirm a dating to the time of Claudius.

That Septimius-Dictys and Malalas may be referring to the same event is suggested by the fact that they both date the earthquake by reference to a "thirteenth year". Confusion may have arisen over the name of the emperor, for Claudius was Tiberius Claudius Nero Germanicus, while Nero was widely known as Nero Claudius. The nature of the available evidence makes it very difficult to solve this problem. A dating to the time of Nero goes some way towards fitting the report given by Philostratus (this is the solution preferred by Di Vita), but it has to be said that Malalas seems more reliable, for he gives the impression of reporting "official" news of the earthquake and rebuilding work, whereas the information provided by Septimius-Dictys is more in the nature of a literary anecdote. These unsolved chronological problems oblige us to offer three possible dates: 53, 62 or 66.

<092> 60 ● Colossae, ● Hierapolis (Phrygia), ● Laodicea (Phrygia)

sources 1 Tac. Ann. 14.27.1; Eus. Hieron. Chron. 183h

sources 2 Orac. Sibyll. 4.107; Georg. Sync. 636

literature Ritti (1985); Mitchell (1987)

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Shebalin *et al.* (1974); Guidoboni (1989)

In the *Annals*, Tacitus mentions an earthquake at Laodicea in 60 AD. and comments on the inhabitants' praiseworthy success in arranging to rebuild the city with their own financial resources: "In the same year, Laodicea, a flourishing town in Asia, was

destroyed in an earthquake and rebuilt from its own resources, without any help from Rome”.

Eodem anno, ex inlustribus Asiae urbibus Laodicea tremore terrae prolapsa, nullo a nobis remedio, propriis opibus revaluit.

Eusebius also mentions this earthquake, though he dates it to 64 AD. and adds Hierapolis and Colossae to the list of cities that were destroyed: “Three cities in Asia were destroyed in an earthquake: Laodicea, Hierapolis and Colossae”.

In Asia tres urbes terraemotu conciderunt: Laodicea, Hierapolis, Colossae.

Syncellus provides the same information, except that he dates the earthquake to 53 AD. It seems sensible to prefer the evidence provided by Tacitus (see also Ritti 1985, p.27).

<093> 61 ●Achaia

sources Sen. NQ 6.1.13, 7.28.3, ad Luc. 14.91.9
literature Ho Peng Yoke (1962); Yeomans (1991)
catalogues Manetti [1457]; von Hoff (1840); Mallet (1853); Guidoboni (1989)

In two passages in his *Naturales Quaestiones*, Seneca records two earthquakes: one in Achaia and another in Macedonia (6.1.13): “Last year, the same disastrous force, whatever it is, which has now affected Campania, struck Achaia and Macedonia”.

Anno priore Achaia et Macedoniam, quaecumque est ista vis mali quae incurrit nunc Campaniam, laesit.

At 7.28.3, he writes: “This comet appeared during the consulship of Paterculus and Vopiscus, and its effects were as predicted by Aristotle and Theophrastus; for there were very strong and continuous storms everywhere; but earthquakes caused the collapse of cities in Achaia and Macedonia”.

Fecit hic cometes, qui Paterculo et Vopisco consulibus apparuit, quae ab Aristotele Theophrastoque sunt praedicta; fuerunt enim maximae et continuae tempestates ubique, at in Achaia Macedoniaque urbes terrarum motibus prorutae sunt.

There may be a passing reference to this earthquake in Achaia in one of Seneca’s letters to Lucilius: “How many times have cities in Achaia collapsed as a result of a single earthquake tremor?”.

Quotiens Achaiae urbes uno tremore ceciderunt?

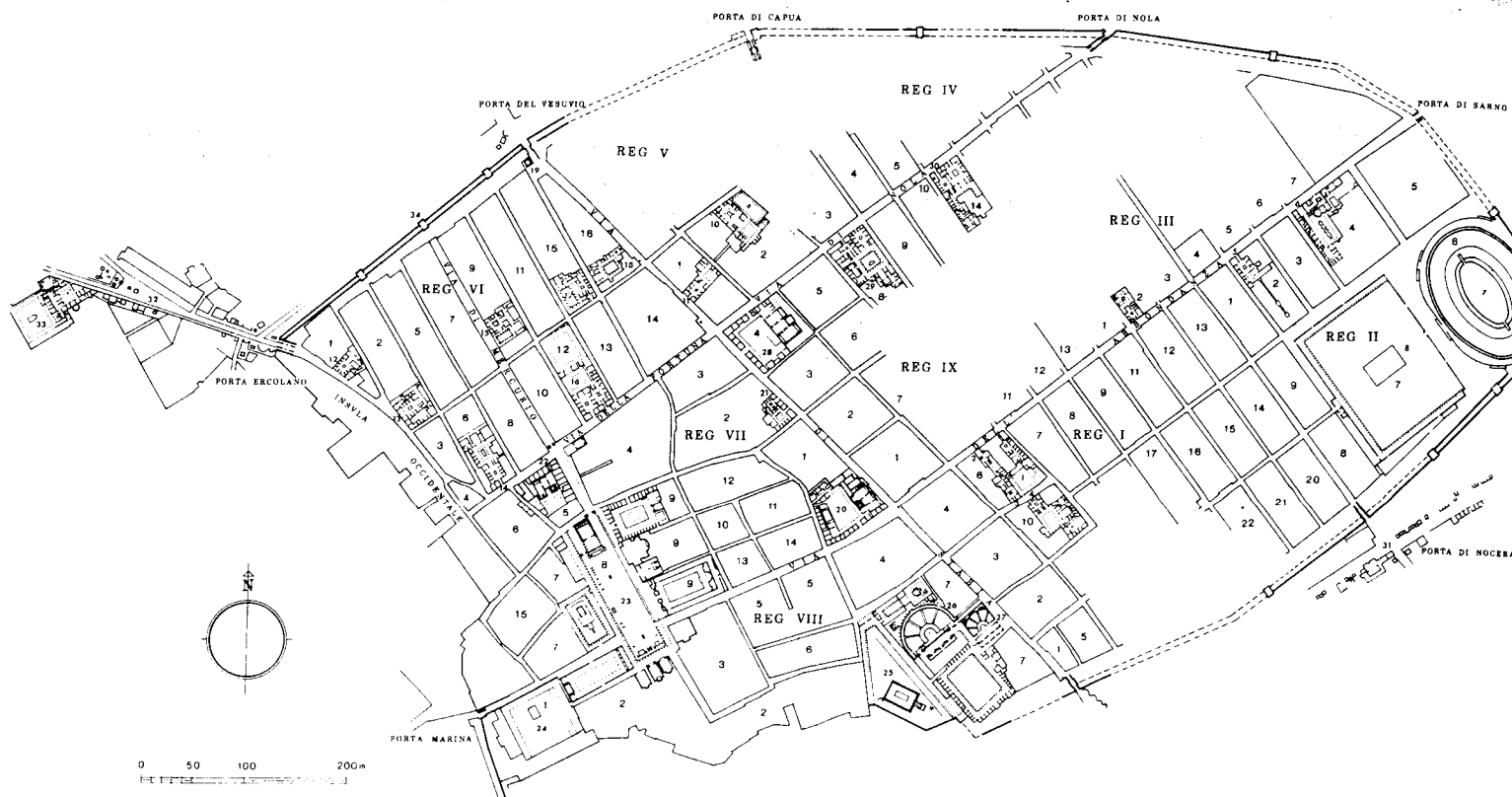
If we accept the dating of the Campania earthquake to 62 AD, then those in Achaia and Macedonia must have occurred in 61.

For the complex problems concerning the dating of the Campania earthquake, see entry <095>.

<094> 61 ●Macedonia

sources Sen. NQ 6.1.13, 7.28.3
literature Ho Peng Yoke (1962); Yeomans (1991)
catalogues Manetti [1457]; von Hoff (1840); Mallet (1853); Guidoboni (1989)

See entry <093>.



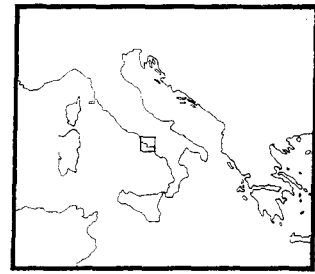
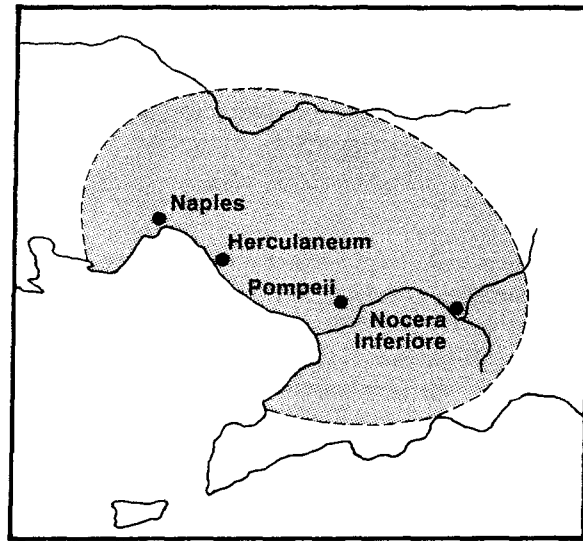
Plan of the city of Pompeii (survey by H.Eschebach and drawing by J.-P.Adam).
The numbers refer to houses and other buildings mentioned in the catalogue. Damage
resulting from the 62 A.D. earthquake affected much of the urban area (from Adam 1989 c).

(095) **5 February 62 •Herculaneum, •Naples, •Nocera Inferiore,
•Pompeii, •Campania**

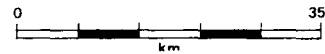
- sources Sen. *NQ* 6.1.1-3, 6.1.10, 6.25.3, 6.30.4-5, 6.31.1, 6.31.3; Tac. *Ann.* 15.22.1
- inscriptions *CIL* 10.846 = *ILS* 6367; *CIL* 10.1406 = *ILS* 250; *AE* 1979, 170
- literature Jonas (1870); Mau (1876); de Rossi M.S. (1879 a); Chabert (1903); Thédenat (1905); Maiuri (1929); Baratta (1936); Maiuri (1942); Lecocq (1949); Onorato (1949); Schefold (1952, 1953-54, 1962); Ho Peng Yoke (1962); Andreau (1973); Guadagno (1978); Andreau (1979); Schefold (1980); de Vos and de Vos (1982); Henry (1982); De Caro (1983); Burnand (1984); Hine (1984); Strocka (1984); Barbet (1985); Adam (1986); Jacobelli (1987, 1988); Adam (1989 a, b, c); *Catalogo epigrafi* (1989); Koloski-Ostrow (1990); Pappalardo (1990); Varone (1991)
- catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Mercalli (1883); Capocci (1861); Baratta (1901); Carrozzo *et al.* (1973); Guidoboni (1989)

The earliest information we have about an earthquake which seriously damaged Pompeii during the reign of Nero comes from Seneca and Tacitus rather than from archaeological discoveries, which have simply served to confirm their reports. Seneca tells of the disaster in Book vi of the *Naturales Quaestiones*, using appropriately stirring language for such a dramatic event. Tacitus is much more succinct, simply recording that most of the famous city of Pompeii was destroyed in an earthquake. It is interesting to note that, although their accounts are very different, both authors agree in describing Pompeii as a "famous" city — a quality which they do not attribute to Nocera or Herculaneum. This suggests that a certain number of rich families who were influential in Rome either lived or owned property at Pompeii.

Seneca's text (6.1.1-3) reads as follows: "My dear Lucilius, I hear that Pompeii, a famous town in Campania, between the coast of Surrentum and Stabiae on the one side and that of Herculaneum on the other, and set back from the sea in a pleasant



5 February
62



bay, has been reduced to ruins by an earthquake, and that the neighbouring area has been affected too. And it happened in winter, which our ancestors claimed was a time free from such dangers. The earthquake occurred on 5 February [during the consulship of Regulus and Verginius] and devastated Campania, which is never safe from such dangers, but has not suffered badly in the past, getting off with a fright on many occasions. Part of Herculaneum is also in ruins, and what is left is in danger of collapse; and although the colony of Nocera escaped destruction, it is not without its problems. Naples also suffered slight damage: many private houses were lost, but not public buildings. Some villas did collapse, but in many places the tremors caused no damage. Furthermore, a flock of hundreds of sheep was killed, statues were split open, and some people were so deranged by what happened that they wandered aimlessly around”.

Pompeios, celebrem Campaniae urbem, in quam ab altera parte Surrentinum Stabianumque litus, ab altera Herculanense conveniunt et mare ex aperto reductum amoeno sinu cingunt, consedisae terrae motu, vexatis quaecumque adiacebant regionibus, Lucili, virorum optime, audivimus, et quidem hibernis diebus, quos vacare a tali periculo maiores nostri solebant promittere. Nonis Februariis hic fuit motus [Regulo et Verginio consulibus], qui Campaniam, numquam securam huius mali, indemnem tamen et totiens defunctam metu, magna strage vastavit. Nam et Herculanensis oppidi pars ruit dubieque stant etiam quae relictæ sunt, et Nucerinorum colonia, ut sine clade, ita non sine querela est. Neapolis quoque privatim multa, publice nihil amisit leviter ingenti malo perstricta; villae vero prorutae, passim sine iniuria tremuere. Adiciuntur his illa: sexcentarum ovium gregem exanimatum et divisas statuas, motae post hoc mentis aliquos atque impotentes sui errasse.

Tacitus reports what happened with all the brevity of an annalist: “Pompeii, a famous town in Campania, was seriously damaged in an earthquake”.

Et motu terrae celebre Campaniae oppidum Pompei magna ex parte proruit.

Seneca’s text, which may originally have been conceived as a letter to Lucilius, provides other interesting information about damage caused by this earthquake. In Book vi (30.4-5) he writes: “A great deal has been said about the extraordinary effects of these earth tremors, and the amazing sights they produce. Why, then, should anyone be surprised if a single bronze statue, which is not solid but hollow and thin, should split, when there may have been some air inside seeking a way out? Surely that is easy to understand? We have seen the corners of buildings split open and then

move back into place. There are some buildings, in fact, which are poorly set in their foundations and were made by negligent and slovenly builders, and yet have become firmer by being repeatedly shaken in an earthquake.

So if an earthquake cracks whole walls and houses, and splits the sides of great towers, however solid they may be, and breaks up piles on which structures are supported, what is so special about a statue being split from top to bottom into two equal halves?"

Quantas res hi terrarum tremores quamque mira spectacula ediderint, satis dictum est; cur ergo aliquis ad hoc stupet quod aes unius statuae, ne solidum quidem sed concavum ac tenue, disruptum est, cum fortasse in illud se spiritus quaerens fugam inclusit? Illud vero quis nescit? Diductis aedificia angulis vidimus moveri iterumque componi. Quaedam vero parum aptata positu suo et a fabris negligentius solutiusque composita terrae motus saepius agitata compegit.

Quod si totos parietes et totas findit domos et latera magnarum turrium, quamvis solida sint, scindit et pilas operibus subditas dissipat, quid est quare quisquam dignum adnotari putet sectam esse aequaliter ab imo ad caput in partes duas statuum?

Seneca also records the comments of an eyewitness to the earthquake (6.31.3): "I also think it worth recording what I learned from a very wise and respected man (he happened to be taking a bath when it happened): he said that while in the bath he saw the floor tiles separate from one another and come back together again, and that when the floor opened up, water was sucked into the joins, only to bubble and squirt out again when it closed back. And I heard the same person say that he saw earthen walls vibrating more sinuously and rhythmically than the nature of a hard substance permits".

Hoc quoque dignum memoria iudico ab eruditissimo et gravissimo viro cognitum. Forte enim, cum hoc evenit, lavabatur. Vidisse se affirmat in balneo tessellas quibus solum erat stratum alteram ab altera separari intemque committi et aquam modo recipi in commissuras pavimento recedente, modo compresso bullire et elidi. Eundem audiivi narrantem vidisse se macerias mollius crebriusque tremere quam natura duri sinit.

Elsewhere in the *Naturales Quaestiones* Seneca writes that there were also destructive after-shocks, but that damage was limited to Campania: (6.31.1) "Why, then, did this earthquake last for several days? For Campania was subject to continuing tremors which, although less violent, caused substantial damage, because buildings that had already been shaken were shaken again, and in their crippled state, shaking rather than a heavy impact was sufficient to cause their collapse".

Quare tamen per plures dies motus fuit? Non desiit enim assidue tremere Campania, clementius quidem, sed cum ingenti damno, quia quassa quatiebat, quibus ad cadendum male stantibus opus non erat impelli sed agitari.

(6.25.3) "That recent earthquake, which is the talk of the whole world, was not felt beyond Campania".

Ecce hic, qui implevit fabulis orbem, non transcendit Campaniam.

The social and economic consequences of the earthquake were sufficiently serious to cause some of the local inhabitants to emigrate. Thus Seneca writes (6.1.10): "Let us therefore face with courage a disaster which cannot be avoided or foreseen, and stop listening to those who turned their backs on Campania and emigrated after the earthquake, declaring that they would never set foot there again. For who can promise them that they will be on more solid foundations in one place rather than another?"

Proinde magnum sumamus animum adversus istam cladem quae nec evitari nec providi potest, desinamusque audire istos qui Campaniae reuntiaverunt quique post hunc casum emigraverunt negantque ipsos umquam in illam regionem accessuros. Quis enim illis promittit melioribus fundamentis hoc aut illud solum stare?

There have been lengthy discussions about the date of the earthquake, since the two literary sources which report it disagree on that point. Tacitus dates it to 62. The phrase *isdem consulibus* which he uses in *Ann.* 15.22 in fact refers to the passage in 14.48 where the consuls P.Marius Celsus and L.Asinius Gallus, who were in office in 62, are mentioned. Seneca's expression *Nonis Februariis [...] Regulo et Verginio consulibus* seems to date the earthquake to 5 February 63, for it was in 63 that C.Memmius Regulus and L.Verginius Rufus were in office. Scholars have long been divided over this discrepancy of dates. There has been a whole series of studies on the matter, from the dissertation by Jonas (1870, pp.53-4) to studies by Chabert (1903), and Lecocq (1949). But largely thanks to the detailed reconstruction of the case by Onorato (1949), it is being increasingly accepted that the phrase *Regulo et Verginio consulibus* is a later interpolation, probably occurring at the time of Tacitus, who may have had this very passage from Seneca in mind. Recently, however, Henry (1982, pp.174-9) has attempted to reconcile the different dates provided by Tacitus and Seneca, by suggesting that there were two separate earthquakes: one towards the end of 62 AD, as recorded by Tacitus, and the other, as referred to by Seneca, on 5 February 63 AD. Hine (1984) acknowledges that Henry's argument has a certain plausibility, but rejects her conclusions, and confirms the sound reasons for accepting the interpolation theory and thus for dating the earthquake to 5 February 62 AD.

If we date the Pompeii earthquake to 62, moreover, we solve what would be internal problems in the *Naturales Quaestiones* text with a dating to 63. In Book VII (28.3), Seneca describes the appearance of a comet, which remained visible for six months in the second half of the year 60. Tacitus also refers to this comet (*Ann.* 14.22.1), and it was observed, in addition, by Chinese astronomers (Ho Peng Yoke 1962, p.149). In the same passage, Seneca refers to the effects which he claims were the results of the comet's passage: widespread atmospheric disturbances and earthquakes in Achaia and Macedonia. Seneca contradicts Aristotle in claiming that these phenomena lasted for a whole year — which means that they can be dated to 60-61 (see entries <093> and <094>). In another passage (6.1.13), he had recorded the Achaia and Macedonia earthquake as having occurred "the year before" (*anno priore*) the one at Pompeii. Thus the only way to avoid making the text of the *Naturales Quaestiones* self-contradictory is to date the earthquake in Campania to 62.

There are also three inscriptions which refer to this earthquake:

- 1) concerns the Temple of Isis at Pompeii;
- 2) concerns the Temple of the *Mater Deum* at Herculaneum, which was restored by the emperor Vespasian;
- 3) concerns repairs to an unidentified building in the *municipium* of Herculaneum.

1) Pompeii. The inscription was found in the ruins of the Temple of Isis, and is now in the Museo Nazionale in Naples. It can be dated to between 64 and 68 AD. (*CIL* 10.846 = *ILS* 6367; Baratta 1936, p.12; de Vos and de Vos 1982, p.73; Burnand 1984, p.174, no.1; *Catalogo epigrafico* 1989, p.141): "Numerius Popidius Celsinus, son of Numerius, at his own expense completely rebuilt the Temple of Isis, which had collapsed in an earthquake. Although he was only six years old, the decurions elected him a member of their order without payment, because of his generosity".

N(umerius) Popidius N(umerii) f(ilius) Celsinus / aedem Isidis terrae motu conlapsam / a fundamento p(ecunia) s(ua) restituit; hunc decuriones ob liberalitatem, / cum esset annorum sexs, ordini suo gratis adlegerunt.

This inscription bears witness to the complete rebuilding of the temple, which had collapsed in an earthquake. The work was carried out by the freedman Numerius Popidius Ampliatus, father of Numerius Popidius Celsinus, who is also well-known as a *minister* of Fortuna Augusta. It is not possible to work out exactly when the temple was rebuilt, but it is likely to have been soon after the earthquake — in other words, at the end of the reign of Nero.

2) Herculaneum. The inscription dates to 76 AD., and is now in the Museo Nazionale in Naples (*CIL* 10.1406 = *ILS* 250; Baratta 1936, p.11; Guadagno 1978, pp.135-6; de Vos and de Vos 1982, p.283; Burnand 1984, p.174, no.2; *Catalogo epigrafi* 1989, pp.140-1): “The emperor Caesar Vespasianus Augustus, *pontifex maximus*, on whom has been conferred a seventh power as tribune, emperor for the seventeenth time, father of the nation, consul for the seventh time, designated for the eighth time, restored the Temple of the Mother of the Gods, which had collapsed in an earthquake”.

Imp(erator) Caesar Vespasianus Aug(ustus) pontif(ex) max(imus), / trib(unicia) pot(estate) vii, imp(erator) xvii, p(ater) p(atriciae), co(n)s(ul) vii design(atus) viii, / templum Matris Deum terrae motu conlapsum restituit.

The inscription records the rebuilding of the Temple of the *Mater Deum* by Vespasian in the first half of 76 AD.

3) Herculaneum. A monumental inscription on adjacent panels. It can be dated to 75-76 AD., but is unfortunately very defective (Guadagno 1978, pp.134-6, no.2; *AE* 1979, 170; Burnand 1984, p.174, no.2 bis; *Catalogo epigrafi* 1989, p.140): “The emperor C[ae]sar V[esp]as[ianus] Augustus, *pontifex maximus*, on whom has been conferred a seventh power as tribune, e[m]peror for the seventeenth time, father] of the nation, c[onsul] for the seventh time, designated for the eighth time, *censor*], [restored ---] of the *municipium* of Herculaneum [destroyed? by an earthquake]”.

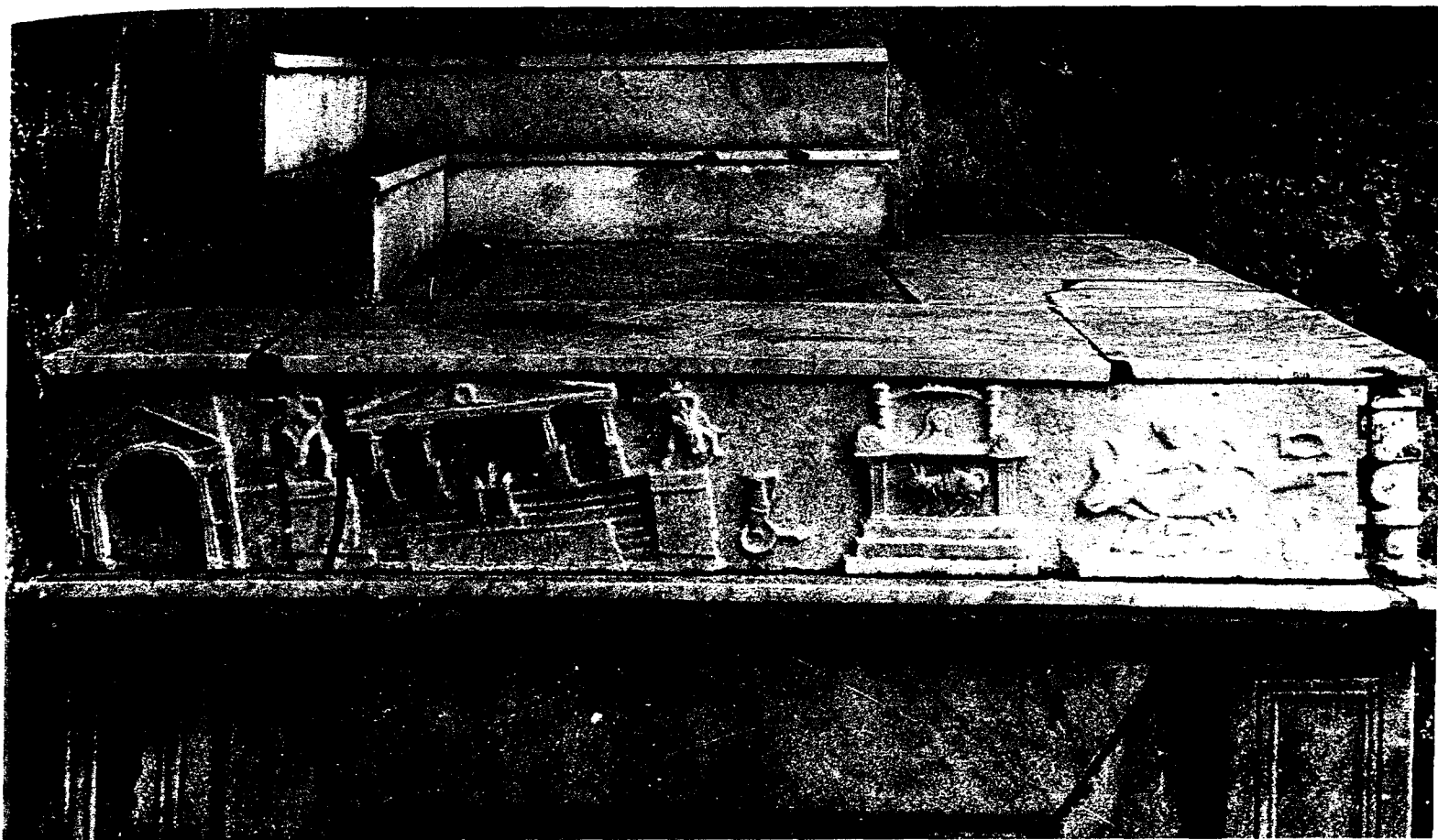
Imp(erator) C[ae]sar V[esp]as[ianu]s Aug(ustus) pont(ifex) max(imus), trib(unicia) pot(estate) vii, i[mp]p(erator) xvii, p(ater)] p(atriciae), c[o(n)s(ul) vii, des(ignatus) viii, censor] / c[---]ge[---] municipi Herculane[i] terrae motu conlapsum? restituit].

The text is that established by Guadagno (1978, pp.134-6, no.2), on the basis of *CIL* 10.1406 = *ILS* 250; see inscription (2), and *Catalogo epigrafi* (1989, p.140). Guadagno rightly sees a connection between the two inscriptions, which “are to be related to steps taken by the emperor to repair damage caused by the earthquake of 62”. The surviving text suggests a dating to the second half of 75 or the first half of 76. The latter is in fact preferable.

There is also a unique piece of archaeological evidence available to us in the form of two low reliefs which both show buildings in Pompeii at the very moment when they were being destroyed in the earthquake.

The first of these was found in 1875, set into one side of the *lararium* at the house of L. Caecilius Jucundus (Mau 1876; de Rossi M.S. 1879 a), as a decoration for the upper part of the podium of the shrine: one can see on the left the *Capitolium*, or Temple of Jupiter, in the Forum, which was built in the second half of the second century B.C., as well as the triumphal arch which stood on its western side. Both are shown with a pronounced lean, as a way of conveying the movement of the ground on which they stood. There is something naïf about the way the sculptor has tried to intensify the dynamic effect of what was happening by representing two horsemen, one on each side of the temple, as they abandon their statuesque rigidity and desperately seek to regain their balance by raising one leg. On the right-hand side of the panel is an altar with an ox being led to the sacrifice. This represents an offering being made to the gods by those people of Pompeii who survived the earthquake.

The second low relief (it was unfortunately stolen in 1977), after being kept in the Antiquarium, was set into the wall below the *lararium* of Caecilius Jucundus in 1902,



Pompeii. A marble relief set into the *lararium* at the House of L. Caecilius Jucundus. It represents the destruction of the temple of Jupiter and a triumphal arch in the earthquake of 62. On the right is an expiatory sacrifice being carried out after the disaster.

◀ A marble relief (stolen in the summer of 1977) representing some of the effects of the earthquake of 62. The *castellum aquae*, is still intact, but the Vesuvius Gate is leaning at an angle and two mules are fleeing in terror (photo Fototeca Unione, Rome).

because of its relationship to the other one (Thédenat 1905). In the relief could be seen the *castellum aquae* still standing at the end of the aqueduct, while the gate in the walls beside it, known as the "Vesuvius Gate", has been knocked down by the earthquake, and two mules harnessed to a cart are fleeing in terror (Adam 1989 a, pp.168-71).

There are three travertine *cippi* — one found outside the Nocera Gate, one outside the Herculanean Gate, and the third outside the Vesuvius Gate, and all in the respective necropolis areas (de Vos and de Vos 1982, pp.13, 154-6, 178, 231) — which provide evidence of imperial intervention which may have been related to the effects of the earthquake: "On the authority of the emperor Caesar Vespasianus Augustus, the tribune Titus Suedius Clemens, after an enquiry and the checking of measurements, restored to the local authority of Pompeii public land occupied by private persons".

Ex auctoritate imp(eratoris) Caesaris Vespasiani Aug(usti) loca publica a privatis pos-

sessa T.Suedius Clemens tribunus causis cognitis et mensuris factis rei publicae Pompeianorum restituit.

Andreau (1979, pp.41-2) has pointed out, however, that Titus Suedius Clemens's action may have no direct link with the effects of the earthquake and the rebuilding of the city; for other inscriptions dating to the time of Vespasian have been found in Italy and certain Roman provinces, which tell of public land being claimed back from private persons in areas where there is no evidence of seismic activity.

As Adam (1989 c) points out, no conclusion as to the nature of the tremors can be drawn from the description contained in Seneca's account alone, for all its great historical value. If, therefore, we wish to assess the importance of the earthquake, its effect on reconstruction architecture, on the setting up of new building projects, and on the adoption of new building techniques, we have to turn to archaeological data, which are particularly rich because of the fact that the city was buried in lava 17 years later. It is now impossible to compile a list of the houses at Pompeii which were actually inhabited in 79 AD., and in spite of the recovery of so many bronze or marble statues and ornaments which decorated the Forum, it is still difficult to gain a clear idea of the state of the Forum at that time.

In view of the extent of the disaster, we may well wonder whether political action was taken to assist the stricken city, rather in the way that Titus aided the cities which were destroyed by the eruption of Vesuvius in 79 AD. (Suet. *Titus* 8; Dio Cass. 66.23). It seems, however, that Nero was completely unperturbed on this occasion. On the other hand, when there was a massive fire in Rome two years later, he was deeply concerned about both the rebuilding of the city and the construction of the *Domus aurea*.

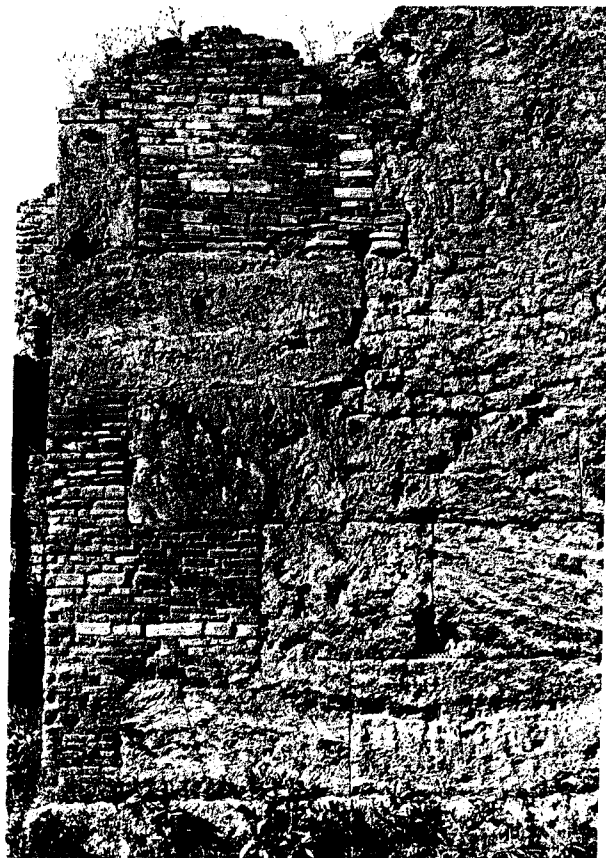
Like all the other Campanians who suffered in the earthquake of 62 AD., therefore, the people of Pompeii had to organise the rebuilding of the city and its life on their own. The first act of imperial assistance for which we have written evidence was the restoration of the Temple of the *Mater Deum* at Herculaneum (*CIL* 10.1406, see inscription 2 above), and it has been argued from this act of pious generosity that similar aid was likely to have been extended to Pompeii.

It is possible to establish the nature of the damage at Pompeii in some detail by examining those buildings which were restored to a greater or lesser extent, and by observing which buildings were abandoned.

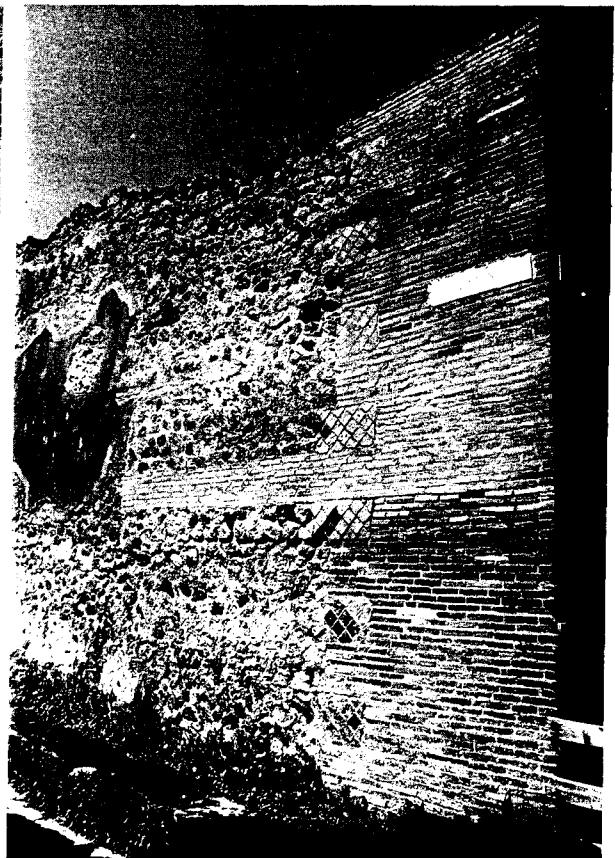
The commonest kind of damage is cracks caused by movement in the masonry; and these cracks may be accompanied by an adjacent wall leaning away from the vertical. The fact that a large number of wall ends and corners were rebuilt shows that such masonry structures were very vulnerable, not only because when a wall leans it ceases to support partitions and corners, but also because, depending on the direction in which it moves, one of the two walls meeting at a corner may strike violently against the one adjacent to it. The collapse of wall ends on either side of a door, on the other hand, occurs when the architrave falls, thereby depriving the doorway of longitudinal support.

At Pompeii, cracks were filled with material salvaged from the ruins, including many fragments of tiles and bricks, which make it easy to identify the repairs. The fact that so much salvaged material was systematically reused is related to the nature of the masonry. This consisted of *opus incertum* or *opus reticulatum* facing, made of pieces of stone held together with mortar having a high earth and low lime content. Masonry of this type was very vulnerable to earthquake tremors, and as walls collapsed they were reduced to heaps of debris including fragments of roof-tiles, which were subsequently salvaged and used again.

Without going into details as to the various sources of materials used, we can say that the stone fragments used in *opus incertum* were preferred to other materials, and that they gave strikingly beautiful colour variations to the facings. The imaginative



Pompeii. A corner of the House of Orpheus (see city plan VI,14,20), rebuilt after the earthquake using some of the original limestone blocks with layers of tiles and bricks.



Pompeii. A corner of the House of the Labyrinth (see city plan VI,11,10), rebuilt after the earthquake in brick and *opus reticulatum* (photos J.-P.Adam).

results were achieved more from necessity than intention, and were enhanced by the inclusion of a variety of pottery fragments — usually mixed up with the salvaged material rather than used on their own — and by the reuse of a variety of different materials: pottery fragments, pebbles and fragments of mosaic.

When walls came apart, it did not necessarily mean that the masonry collapsed, provided that a wall did not lean so much that the armature came away. There are many examples of people abandoning the worst damaged parts of their houses and keeping what were sometimes substantial areas of wall, in spite of the fact that they were distorted. Any new walls were obviously put up perfectly vertical, and the greater the distortion in damaged walls, the easier it is to see where they meet new masonry.

As Adam's investigations (1989 c) have shown, the whole of the façade and a large part of the west wall of the house known as the House of Achilles were rebuilt in *opus incertum* with layers of bricks, whereas the rear of the house was undamaged. The case of the house of C.Cuspius Pansa or that of P.Paquiis Proculus in Via dell'Abbondanza, on the other hand, is quite different. The old Samnite-style façade with its door framed with cubic capitals survived, whereas the west corner and the adjacent wall were rebuilt. In both cases, this restoration work had only just been completed by 79 AD, and had still not been covered with the layer of plaster which would have disguised the structural differences and partly covered up the projection where the two walls met.

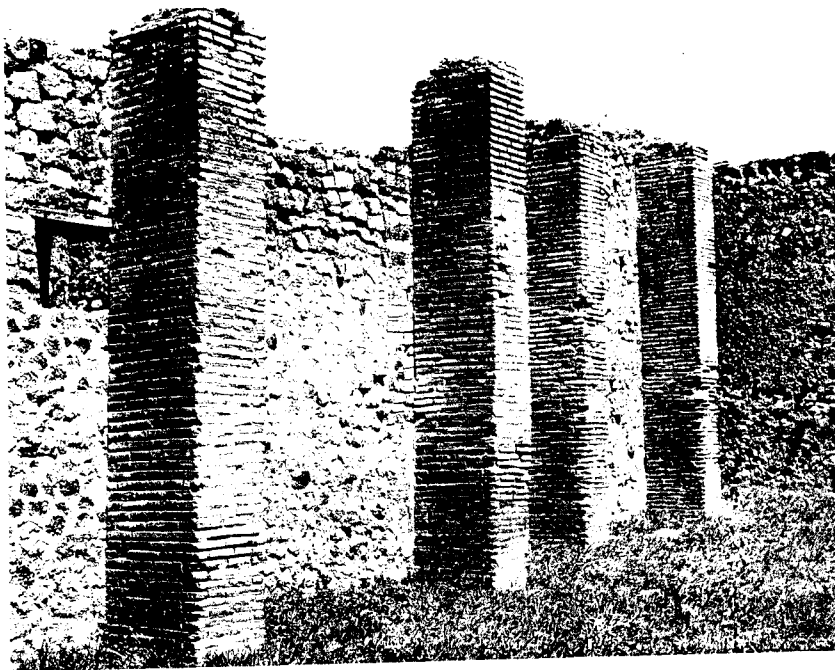
In some cases obvious movement or weakening of the masonry could be remedied



Pompeii. Masonry built after the 62 A.D. earthquake, using *opus incertum* stones recovered from the ruins, along with regular areas of brickwork.

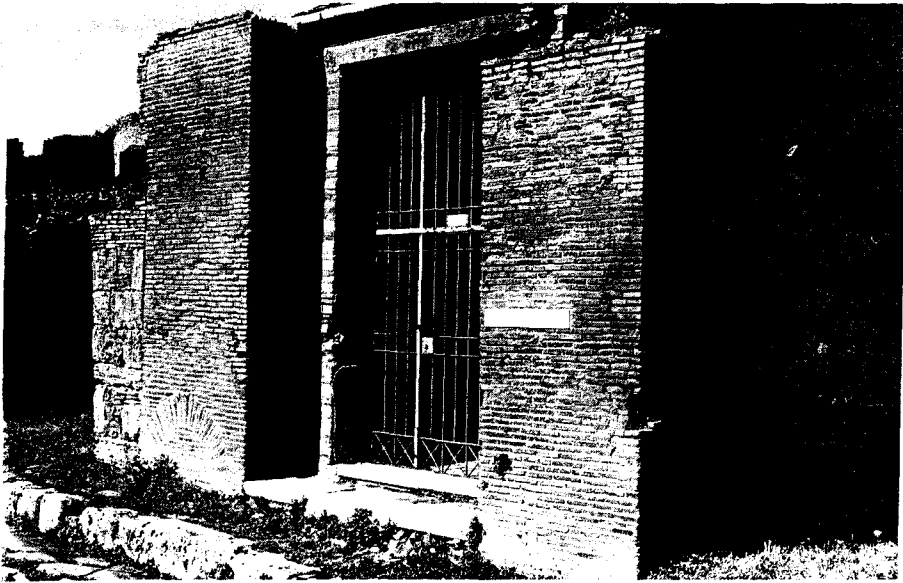
Photographs by J.-P. Adam

Pompeii. Internal walls of an *atrium* (see city plan IX,1) with new brick buttresses.



Pompeii. South-west corner of the Building of Eumachia, showing the join between the façade, which was destroyed in the earthquake and rebuilt in brick, and the earlier masonry.





Pompeii. The façade of the House of Marcus Lucretius (see city plan X,3,5) was badly damaged in the earthquake. It was rebuilt in brick, and any decoration which may have survived on the plasterwork was sacrificed to the solidity provided by two strong buttresses.



Pompeii. A large fissure in an *opus incertum* wall, which was filled in after the 62 A.D. earthquake using terracotta materials (tiles and bricks) and rectangular stones. The building can be found in the plan of the city at VI,7,5.

without demolition, by putting in supports in the form of brick buttresses; and these could also support the beams of the upper floor or supporting walls which did not project very much but were adjacent to a larger surface area. Doors were weak points, because they tended to give way below architraves when the latter moved or slipped down, and because movement in walls was greatest at the top. Hence the safest way to preserve the building was to completely wall up these openings, as was done at the Stabian Baths and in many houses and shops, where such walling up was carried out both for repair purposes and in connection with many subsequent changes of ownership and use.

Collapses and cracks are not always accompanied by a lean in the walls that remain. Hence repair work is easily identifiable if a wall has not been given, or has lost, the covering layer intended to smooth over unevenness. A particularly interesting case in this connection is the Building of Eumachia, whose façade giving on to the Forum was rebuilt in brick, for particular care was taken to restore the original appearance of the original stone facing. White stucco was then used to hide any traces of the building's having been modified.

Adam's researches (1989 c) show that there are examples of joins along an approximately vertical line which indicate the complete collapse of a section of wall; while other repairs carried out on a slant or horizontally show that perhaps only the upper part of a wall was destroyed. There is a bakery, for example, where the original *opus Africanum* masonry was extended upwards from 1.5 m above ground level, using randomly mixed materials. It is clear that poorer quality masonry held together with mortar having a high earth content was badly damaged by the earthquake tremors; but good quality masonry was also damaged, as can be seen from the complete destruction of the Vesuvius Gate (it did, however, consist basically of a single arch) and from many houses whose walls were partly destroyed even though they were made of stone blocks.

It must be pointed out, however, that for the most part the city walls survived because

they were supported by a substantial earth rampart in the form of an *agger* on the inside. Some other masonry structures also survived. The fourth century B.C. façade of the famous House of the Surgeon, which was made of large limestone blocks, survived intact although it did not have the benefit of an earth support; and the tufa wall of the House of the Little Fountain also survived.

Wall corners were generally speaking very vulnerable, and were repaired in a variety of different ways, depending on people's resources. In most cases repairs were carried out using ordinary salvaged materials; but there are cases where greater care was taken, using strong courses of bricks arranged in order and attached to the adjacent walls.

Some buildings with vaulted ceilings were too badly damaged to be repaired quickly. Such were the men's *tepidarium* and *calidarium* in the Stabian Baths, which completely collapsed and had still not been repaired in 79 A.D. Those buildings in the baths complex which did not collapse — the *vestibulum*, the *apodyterium* and the vaulted galleries of the amphitheatre, for example — were consolidated with substantial arched buttresses in brick. That part of the Stabian Baths designed for public spectacles was like a single bastion in construction, with walls built against earth ramparts. The earthquake can have had only the slightest effect on this part of the baths complex and, indeed, there are no visible signs of collapses or cracks.

Columns — which were, of course, a standard form of vertical support in Roman architecture — not only suffered serious damage themselves, but their movement or collapse also caused the collapse of countless peristyle and colonnade roofs. The Forum is a good example of this, for as we see it today it is certainly no better preserved, or rather, no better restored, than it was in 79 A.D. While a monumental public building like this needed limestone columns to complete the old tufa colonnades, private buildings, which were less fortunate but built closer together, replaced their tufa columns with masonry columns in which one finds a variety of materials: an example is the *opus incertum* made with lava, as used by building workers to rebuild part of the peristyle of a house near the Forum.

The many traces throughout Pompeii of building sites in operation provide a wealth of information, not so much about the end products as about the particular techniques and materials used in rebuilding work; for the archaeologist has been able to catch the builder at work inside unfinished buildings.

Their lime was always rich, being made from fairly pure limestone, and after slaking it was carried and kept in amphoras whose necks were broken to provide a larger mouth. The lime was deposited, sometimes simply in a heap, near where it was to be used, as in the case of the house known as the "House of Lime", as well as in those of the House of the Moralist and the Villa of Mysteries. In the House of the *Sacellum Iliacum* we find one of the most striking instances of work on a Pompeii building site having been interrupted: a bucket of rich lime has been emptied out on the ground, and the workman has begun making a pile of sand for the mixture. The plaster in the making was abandoned on the morning of 24 August 79 A.D., and had been intended for a wall covering which had only been partly carried out. In the room where the lime was found, only the bottom of the walls had not been covered (the work had been started at the top); but in a nearby room only the top third of the walls had been plastered. What is particularly interesting is that we have here excellent evidence of how fresco painting on plaster was carried out: the artist painted on a fairly small area of plaster so that the pigment could combine with the lime in the plaster before the latter dried out and hardened.

As we have seen, the people of Pompeii repaired the damage to their houses with salvaged materials for the most part. Some were more fortunate in being able to use new materials (usually bricks) for repairing or rebuilding all or parts of their houses, exactly as happened in the case of public buildings. Houses repaired in this way can

be identified on the outside by the considerable modification to the façade, where bricks now play a greater part, and where one notices the disappearance of the usual tufa or plastered masonry pilasters which framed the door in the Samnite tradition. They have been replaced with plain, bare pedestals which were probably intended to be decorated, or else by columns supporting a triangular pediment.

Sometimes the Samnite-style tufa façade has stood up to stress better than the internal structure of the house, which has therefore been subject to most modification. A good example of this type of restoration is the House of the Chase, for its façade on Via della Fortuna is practically the only element of its original form that has been preserved. It is much less common for houses to have been completely demolished and rebuilt. The most important of these is the house of Caius Vibius, where most of the work had been completed, but plastering had only just begun. The façade is entirely without decoration, and has been rebuilt in well-cemented *opus incertum*, with courses of bricks at the corners, and in *opus mixtum*. In the *atrium*, the facings are of brick at ground floor level, whereas there is *opus incertum* at first floor level. The only relic of the old house is a limestone pedestal at one corner of a wing.

The pleasure of the visitor to Pompeii is enhanced by the fact that, unlike Rome and, even more, Ostia, Pompeii did not have systematic planning involving the almost total substitution of brick for stone. None of its public or private buildings has adopted that kind of restoration in an exclusive way. At the Central Baths, for example, certain panels of the façade looking on to the *palaestra* have been faced in polychrome *opus reticulatum*. The room walls — which were to have been plastered — are largely made of *opus incertum*, and the shops which give on to the Via di Stabia have *opus mixtum* façades.

Another public building which had been substantially restored was the *macellum* (meat and fish market). One's attention is attracted by an unusual aspect of its structure, which must be related to restoration work, and which involves an inexplicable lack of continuity. The south side of the market is closed off by a high wall in which there is a door giving on to an alley. As far as the door, the wall has splendid reticulate facing, which is framed by courses of bricks at the corners, and enhanced by the use of colour variations in horizontal lines, using a selection of three local tufas in grey, green and pink. To the left of the door this facing continues exactly as before over the whole height of the wall until, five metres from the door-post, it is suddenly interrupted by an almost vertical line, and the rest of the wall continues in *opus incertum*. One assumes that there were two stages of reconstruction, since the carefully arranged tufa blocks of *opus reticulatum* are a late Pompeian technique, and the *opus incertum* as it appears here also displays all the characteristics of post-62 AD. repair work, at any rate in the upper half of the wall, where a good deal of cementing has been done with a yellow mortar such as one finds in many other cases of rebuilding. However, an examination of the join makes it possible to establish a relative chronology for the two parts of the wall. The skirting of the *opus incertum* part of the wall extends under the *opus reticulatum* facing over a length of about 1.5 m. Such a substantial overlap means that the *opus reticulatum* cannot have been put up first. It is also noticeable that the bottom of the *opus incertum* wall is very different from the upper part. There are two possible explanations for this. One is that the wall completely collapsed and was rebuilt in two stages — presumably at different times. The second stage of the work involved the *opus reticulatum* and was carried out when more resources were available and hence greater care could be taken. This hypothesis does not exclude the possibility that the lower part of the wall was part of the original building. The second explanation is that the whole *opus incertum* predates 62 AD., and only the *opus reticulatum* is rebuilding work.

It is also interesting to note something which accords with the view that the city water system had only been partially and provisionally renewed. In 1942, Maiuri discov-



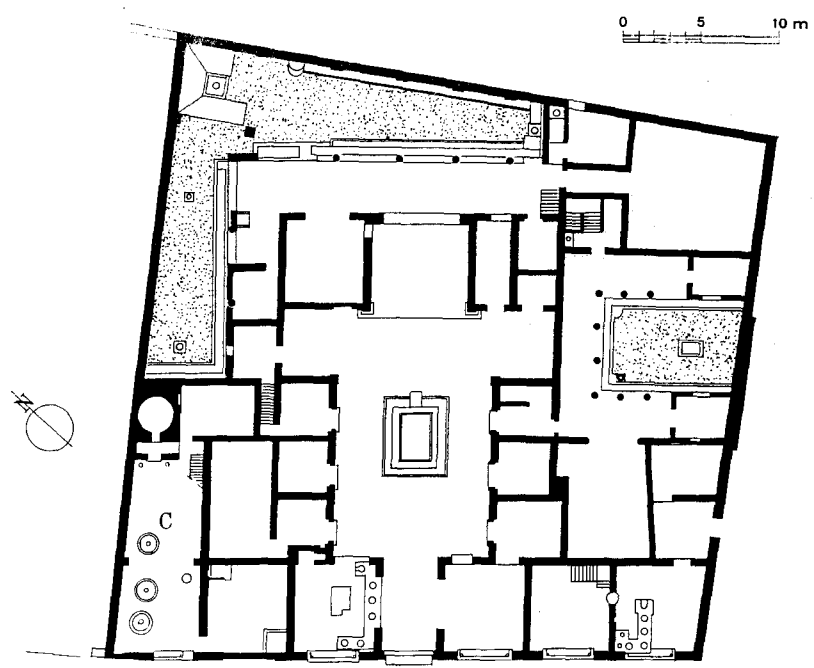
Pompeii. Atrium of the House of Caius Vibius (see city plan VII,2,18), rebuilt after the earthquake of 62, in brick and *opus incertum* (photo J.-P.Adam).

ered a trench 0.65 m deep in the northern part of the Via di Stabia. It was full of lava fragments — indicating that it was open at the time of the eruption — and was found to contain two sections of large diameter lead piping which were deliberately detached from the rest of the piping. On the one hand this shows that reconstruction of a permanent water system was still going on, and that the work now being undertaken came after the laying of a temporary system; and it also shows the normal depth at which pipes were laid, to protect them from surface erosion and provide them with heat insulation.

The most striking economic and social changes to take place at Pompeii in the aftermath of the earthquake are reflected in the transformation of certain dwelling houses into shops and craft workshops. There is no doubt that many inhabitants of Pompeii were obliged to abandon houses that had been seriously damaged, and that they allowed shopkeepers to use them, or let them, or allowed other people to have control of them. There must also have been families whose members were missing and whose houses were put to use in one way or another; and there may also have been cases of house owners who themselves became shopkeepers or artisans. However that may be, it was clearly not a time of prosperity, but rather one in which events brought about many changes of fortune. New artisan businesses can be identified by the use they make of building space. In particular, they take over rooms which had previously been residential, and change their appearance by altering internal arrangements. Changes to façades, however, do not necessarily indicate a change of use. Thus the largest bakery in Pompeii, namely that of Terentius Proculus, cannot be identified as such in any way from the outside, although it was set up in a house which had been completely destroyed; and the same is true of the Via di Nola bakery, where the oven and grinding equipment were installed in an old *atrium*. Modifications to the distribution and internal arrangement of rooms within a house were not necessarily the result of their being taken over for artisan activities: it could also be a question of property changing hands as people's fortunes rose and fell. And another factor one has to take into account is that these readaptations and restorations were carried out as a matter of necessity, when in other circumstances the owner might have thought them unnecessary or beyond his means. Early looting and the unsystematic nature of the first archaeological excavations have unfortunately affected the physical state of houses and deprived us of a great deal of evidence, thereby often reducing to the status of a hypothesis our understanding of the reasons for an important change of use in a house, or its internal rearrangement. This brief examination of the damage suffered in the earthquake, and of the architec-



Pompeii. The *domus* (see city plan V,3,8) became a bakery after the earthquake, with its oven in the corner of the *atrium* (photo J.-P.Adam).



Pompeii. Plan of the large House of Sallust. After the earthquake of 62 it became an inn (drawing by J.-P.Adam).

tural solutions adopted during the last years of Pompeii, leads us to draw certain conclusions of a technical, economic and social nature. The restoration work was carried out by the inhabitants themselves, or else by modest artisans assisted by fairly unskilled labourers who turned their hand to building work for the occasion. It also seems likely that professional or occasional builders were drawn to Pompeii and the other cities which suffered in the earthquake by the strong demand; and that they were followed by painters and plasterers, who must have arrived after the builders and carpenters had finished their work.

With the exception of the amphitheatre, which was in any case only slightly damaged, public buildings did not receive the same priority treatment. Apparently only three municipal buildings in the Forum were close to completion and, of the seven known temples, only the Temple of Isis had been completely restored, and that was thanks to the generosity of a private citizen. There were, however, some quite important new projects, such as the Central Baths, which were already well advanced in 79 A.D. And the fact that the water system was also being repaired shows that the local authority was in a position to arrange for the repair of what was considered priority work, to be set in motion fairly early. It is difficult to judge how far this justifies our drawing conclusions about the relative importance attributed by first century A.D. Romans to the different parts of their urban environment, whether considered from the point of view of need, convenience or pleasure. One thing that is certain, at least, is that they were not strongly attached to traditional religion, for the abandonment of the temples makes that very clear. The Temple of Isis stands alone as evidence of public religious feeling; and that might lead us to dwell on the attractions of the eastern doctrines of redemption and resurrection. However, the many domestic *lararia* are evidence of a reliance on the values of the family, which accepts and chooses its own divinities for its own purposes.

The policy of the local authority was not to increase trade, for both the *macellum* and the Forum were unfinished, but rather to strengthen local government, as the three Curia buildings show, and to improve leisure facilities in the form of baths and buildings for public shows. The former were found to be in the process of reconstruction, and the latter were either completely operational (the Odeon and the amphitheatre)

or in an advanced state of restoration (the theatre). And then there were damaged parts of the city walls and gates which had not been repaired at all.

Thus, while private citizens — with how much aid we cannot tell — rebuilt or repaired their own homes, the *aediles* made sure their own position was safe by rebuilding the Curia, and they restored to the populace what they judged to be important: water and leisure facilities. The only imperial contribution seems to have been a temple dedicated to Vespasian which had a good position in the Forum and was nearly finished.

New life has recently been given to the theory that between the earthquake of 62 A.D. and the eruption of Vesuvius in 79, there was another earthquake which, though of smaller proportions, was sufficient to leave visible traces. This theory was first put forward by Schefold (1952, 1953-54, 1962 and 1980), who had noticed traces of restoration on paintings datable to the closing years of Pompeii, and it has recently been taken up by Pappalardo (1990). In its original form, the theory of a further earthquake between 62 and 79 was rejected by Strocka (1984) and Barbet (1985). Fresh support from local archaeologists is based in particular on evidence of different restoration stages either in buildings constructed *ex novo* after 62 or in buildings which had already been restored. An example of the first kind of evidence is the east wall of the *calidarium* in the Central Baths (Pappalardo 1990) and the group of buildings to the north of the suburban baths (Jacobelli 1987, 1988). Examples of the second kind — restoration work on buildings or decoration which had already been restored — are the house to the north of that of Fabius Rufus in the *insula occidentalis* (De Caro 1983, Pappalardo 1990), the house to the north of Building IX,12,6 (on the plan of Pompeii), which is currently being excavated (Varone 1991), the Sarno complex (Koloski-Ostrow 1990), and the House of the Little Fountain.

In support of the theory of a second earthquake, it is pointed out that when the eruption of Vesuvius occurred in 79, Pompeii was like a large and active building site, and that this can only be explained in terms of a second destructive event. But it has to be said that we still know very little about how long reconstruction work took in ancient cities, especially at a time when imperial munificence could be absorbed by other reconstruction work (a great fire occurred in Rome in 64, and Nero devoted considerable economic resources to subsequent restoration there). Written sources have nothing to say on the matter (except for a brief reference to the earthquake of 64 in Naples: see entry <096>), and in our opinion, archaeological data are not yet quite sufficient to prove that there was another earthquake, though that is not unlikely, given the seismicity of the area.

<096> 64 • Naples

sources Suet. *Nero* 20.2; Tac. *Ann.* 15.34.1

inscriptions *CIL* 4.3822

literature Sogliano (1888); Sabbatini Tumolesi (1980); De Caro and Greco (1993); Arthur (1989); *Catalogo epigrafi* (1989)

catalogues Manetti [1457]; Bonito (1691); Schmidt (1881); Guidoboni (1989)

According to Tacitus, the theatre collapsed at the end of Nero's first public performance in Naples, but no-one was injured: "Something happened in Naples which most people thought to be an evil omen, but which he considered rather as evidence of divine providence; for after the audience had left, the empty theatre collapsed without injuring anyone".

Illic, plerique ut arbitrabantur, triste, ut ipse, providum potius et secundis numinibus evenit: nam egresso qui adfuerat populo vacuum et sine ullius noxa theatrum conlapsum est.

Suetonius simply records that the theatre was struck by an earthquake on that occasion: "And [Nero] made his début at Naples, and although the theatre was struck by a sudden earthquake, he did not stop singing until he had finished the piece. He sang there on a number of other occasions and for several days".

Et prodit Neapoli primum ac ne concusso quidem repente motu terrae theatro ante cantare destitit, quam inchoatum absolveret nomon. Ibidem saepius et per complures cantavit dies.

Suetonius makes no mention of any earthquake damage, and in fact his account seems to contradict that of Tacitus, who probably exaggerated the seriousness of the occurrence through using a senate source which was hostile to Nero.

Sogliano (1888, p.517) has also linked a wall inscription at Pompeii to this earthquake: "For the safety of Ner[o] during the eart[hquake?]".

Pro salute Ner[onis] / in terr[ae motu?].

Doubts have been cast on Sogliano's suggested reading, however, by Sabbatini Tumolesi (1980, pp.45-6 and 50), in whose opinion the first line simply records a very commonplace kind of *causa muneris: pro salute imperatoris*, which could be the opening words of an *edictum muneris*.

In actual fact, the second line may have no connection with the first: it may be a separate (and illegible) inscription. The inscription may therefore date to any time in Nero's reign (54-68 AD); and even that dating is only valid for the first line, in which the emperor is specifically mentioned. (There is a bibliography in *Catalogo epigrafi* 1989, p.150). Little survives of the theatre in Naples. The identifiable remains may in fact be part of the restoration work carried out after the first century AD. earthquakes, but we do not know when (Arthur 1989, p.502 and fig.273; De Caro and Greco 1993, pp.23-5).

<097> **68 ●Myra, ●Patara, Lycia ▷seismic sea-wave◁**

sources 1 Dio Cass. 63.26.5

sources 2 *Orac. Sibyll.* 4.109-123, 5.126

catalogues Guidoboni (1989)

Dio Cassius mentions a sea-wave on the coast of Lycia in a list of prodigies, some of which occurred in the Rome area: "And it did not worry him that both sets of doors, those of the mausoleum of Augustus and those of his own bedroom, opened of their own accord one night, or that in the Alban territory it rained so much blood that rivers of it flowed over the land, or that the sea retreated a long way from Egypt and covered a great part of Lycia".

Τοιαῦτα μὲν καὶ τότε ἔπαιζεν, οὐδὲ ἔμελεν αὐτῷ ὅτι αἱ θύραι ἀμφότεραι, αἱ τε τοῦ μνημείου τοῦ Αὐγουστείου καὶ αἱ τοῦ κοιτῶνος τοῦ ἐκείνου, αὐτόμαται ἐν τῇ αὐτῇ νυκτὶ ἀνεῳχθησαν, οὐδ' ὅτι ἐν τῷ Ἀλβανῷ τοσοῦτω δὴ τινι αἵματι ὕσεν ὥστε καὶ ποταμοὺς ῥυῆναι, οὐδ' ὅτι ἐκ τῆς Αἰγύπτου ὑπαναχωρήσασα ἐπὶ πολὺ ἡ θάλασσα μέρος μέγα τῆς Λυκίας κατέλαβεν.

The sea-wave is also mentioned, in relation to Patara, in the *Sibylline Oracles* (4.109), within the usual "prophetic" formula and accompanied by poetic images: "Fair Myra of Lycia, the earth shall shake and not remain firm; thou shalt fall headlong to the ground and pray to find another land of refuge, as an emigrant, when with thunders and earthquakes the dark waters of the sea spread sand over Patara, for its godlessness".

This happened in Rome on 9 June. Two days later, Galba, who had been elected emperor by the army immediately after Nero's death, received some ill omens for his future reign as he approached Rome. One of these was a violent earth tremor (Suet. *Galba* 18.1): "And when he made his entry into the city and then into the palace, the earth shook and there was noise like the bellowing of cattle".

Urbem quoque et deinde Palatium ingressum excepit terrae tremor et assimilis quidam mugitui sonus.

It is likely that all the above references are to the same seismic event, but there is no sound basis for linking the landslide near Chieti to the earthquake felt in Rome.

<099> 69 • Nicomedia

sources Mal. 259; *Chron. Pasch.* 246

catalogues Guidoboni (1989)

Malalas mentions this earthquake at Nicomedia in Bithynia in connection with a substantial donation towards reconstruction made by the emperor: "In his reign [that of Vitellius], the great city of Nicomedia, capital of Bithynia, suffered from the wrath of God. The emperor gave generously to the survivors and the city for reconstruction, for it had suffered from the wrath of God shortly before, and was in ruins. He restored it".

Ἐπὶ δὲ τῆς βασιλείας εὐθέως ἔπαθεν ὑπὸ θεομηνίας Νικομήδεια, πόλις μεγάλη, τῆς Βιθυνίας μητρόπολις. καὶ πολλὰ αὐτοῖς τοῖς περιωθεῖσιν ἐχαρίσατο καὶ τῇ πόλει εἰς ἀνανέωσιν ὁ αὐτὸς βασιλεὺς· ἦν γάρ καὶ πρόην παθοῦσα ὑπὸ θεομηνίας καὶ ἐστραμμένη· καὶ ἀνήγειρεν αὐτήν.

The *Chronicon Paschale* simply says: "At the time of the same consuls, that great capital city of Bithynia, Nicomedia, suffered from the wrath of God".

Ἐπὶ τῶν αὐτῶν ὑπάτων ἔπαθεν ἀπὸ θεομηνίας Νικομήδεια μητρόπολις μεγάλη τῆς Βιθυνίας.

<100> the night of 20 June 69-79 • Corinth

sources Suet. *Vesp.* 17; Mal. 261

inscriptions IG 4.203

literature Curtius (1851-52); Schenk von Stauffenberg (1931); Panessa (1991)

catalogues Schmidt (1881); Galanopoulos (1961); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

Corinth was damaged by an earthquake at some time between 69 and 79 AD. There seems to be a reference to the earthquake in an inscription found on the Isthmus of Corinth (IG 4.203): "[Publius Licinius Priscus Iuventianus] carried out the rebuilding of the temple of Eueteria [Good Harvest], Core and Pluto, including the steps and retaining walls, which had been reduced to ruins by earthquakes and the passage of time".

Καὶ τοὺς ναοὺς / τῆς Εὐετηρίας καὶ τῆς Κόρης καὶ τὸ Πλου/τόνκειον καὶ τὰς ἀναβάσεις καὶ τὰ ἀναλήμματα ὑπὸ σεισμῶν καὶ παλαιότητος δια/λελυμένα ἐπεσκεύασεν.

Curtius (1851-52, pp.544-5) dates this rebuilding to the time of a visit by Pausanias towards the middle of the 2nd century AD.

Suetonius states that Vespasian rebuilt and improved many cities which had been

᾿Ω Λυκίης Μύρα καλὰ, σὲ δ' οὐποτε βρασσομένη χθών / στηρίξει· πρηνὴς δὲ κάτω
πίπτουσ' ἐπὶ γαίης / εἰς ἑτέρην εὐξὴ προφυγεῖν χθόνα, οἷα μέτοικος / ἥνικα δὴ
Πατάρων ὁμαδὸν ποτε δυσσεβίῃσιν / βρονταῖς καὶ σεισμοῖσιν ἀλὸς πετάσει μέλαν
ὔδωρ.

<098> **June 68 O the Chieti area, Rome >landslide<**

sources 1 Plin. *n.h.* 2.199, 17.245; Suet. *Nero* 48.2, *Galba* 18.1; Dio Cass. 63.28.1

sources 2 Alb. Miliol. *Cron. Imper.* 590

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853);
Capocci (1861); Schmidt (1881); Mercalli (1883); Baratta (1892, 1899, 1901); Galli (1906);
Carrozzo *et al.* (1973); Guidoboni (1989)

Pliny records that in the last year of the reign of Nero (68 AD.), an event occurred in the territory of the Marrucini (the area around what is now Chieti), which was considered a portent and can be identified as a large landslide (2.199): "Our times have also experienced an equally extraordinary event, which occurred in the last year of Nero's reign. As we have recorded in our history of his reign, what happened was that meadows and olive groves separated by a public road crossed over to opposite sides. This happened in Marrucinian territory, on the land of Vettius Marcellus, a Roman knight who managed Nero's estates".

Non minus mirum ostentum et nostra cognovit aetas anno Neronis principis supremo, sicut in rebus eius exposuimus, pratis oleisque intercedente publica via in contrarias sedis transgressis in agro Marrucino, praediis Vetti Marcelli equitis Romani res Neronis procurantis.

In describing this occurrence as "an equally extraordinary event", Pliny is comparing it to the 91 B.C. earthquake (see entry <056>). In another book of his *Natural History* (17.245), Pliny refers to this landslide again: "Of all the prodigies that have been heard of in our times, the greatest must surely be what happened in the territory of the Marrucini at the time of the fall of the emperor Nero, when a whole olive grove belonging to Vettius Marcellus, a leading member of the equestrian order, crossed the public road, and some farmland on the other side crossed over and took the olive grove's place".

Super omnia quae umquam audita sunt erit prodigium in nostro aevo Neronis principis ruina factum in agro Marrucino, Vettii Marcelli e primis equestris ordinis oliveto universo viam publicam transgresso arvisque inde e contrario in locum oliveti profectis.

What happened preceded the civil strife of 69 AD. and was in the same year as the death of Nero. Other sources refer to earthquakes in that year. Suetonius (*Nero* 48.2) tells how, when he was in flight in the outskirts of Rome, shortly before committing suicide, "he was immediately struck with fear by an earth tremor and a flash of lightning right in front of him".

Statimque tremore terrae et fulgure adverso pavefactus.

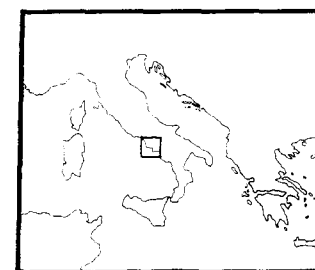
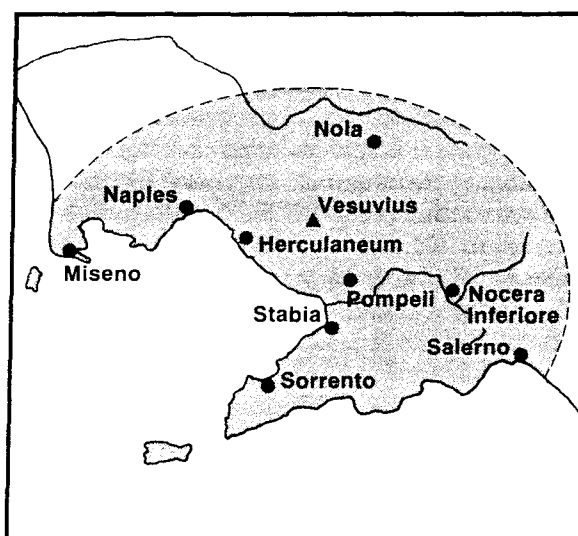
According to Dio Cassius: "While he was on the way a terrible earthquake occurred, so that one might have thought the whole world was bursting asunder and all the spirits of those murdered by him were leaping up to assail him".

Καὶ αὐτοῦ ταῦτα πράσσοντος σεισμός ἐξαίσιος ἐγένετο, ὥστε καὶ δόκησιν παρασχεῖν ὅτι ἢ τε γῆ πᾶσα διαρρήγνυται.

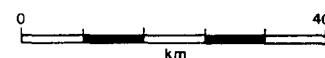


Pliny the Younger describing the eruption of Vesuvius in 79 A.D. (painting by Angelica Kauffmann, engraved by Thomas Burke, London 1794).

The subject was a popular one in its day: E. Bulwer-Lytton's *The Last Days of Pompeii* (1834) enjoyed remarkable success, and was the basis for the libretto of Petrella's opera *Jone* (1858). The subject has been used in the cinema and on television up to our own time.



24-26 August
79



leave an accurate account of it for posterity; I know that immortal fame awaits him if his death is recorded by you. It is true that he perished in a catastrophe which destroyed the loveliest regions of the earth, a fate shared by whole cities and their people, and one so memorable that it is likely to make his name live for ever: and he himself wrote a number of books of lasting value: but you write for all time and can still do much to perpetuate his memory. The fortunate man, in my opinion, is he to whom the gods have granted the power either to do something which is worth recording or to write what is worth reading, and most fortunate of all is the man who can do both. Such a man was my uncle, as his own books and yours will prove. So you set me a task I would choose for myself, and I am more than willing to start on it.

My uncle was stationed at Misenum, in active command of the fleet. On 24 August, in the early afternoon, my mother drew his attention to a cloud of unusual size and appearance. He had been out in the sun, had taken a cold bath, and lunched while lying down, and was then working at his books. He called for his shoes and climbed up to a place which would give him the best view of the phenomenon. It was not clear

damaged in earthquakes or by fire.

Malalas gives a fuller account, reporting that Corinth was destroyed by the earthquake and subsequently rebuilt by Vespasian: "In his reign [that of Vespasian, 69-79 A.D.], during the night of 20 June/Daesus, Corinth, the metropolis of Hellas, suffered from the wrath of God. He gave generously to the survivors and the city".

Ἐπὶ δὲ τῆς αὐτοῦ βασιλείας ἔπαθεν ὑπὸ θεομηνίας ἡ Κόρινθος, μητρόπολις τῆς Ἑλλάδος μηνὶ ἰουνίῳ τῷ καὶ δαισίῳ κ', ἑσπέρας βαθείας. καὶ ἐχαρίσατο τοῖς ζήσασιν καὶ τῇ πόλει πολλά.

<101> 77 ●Cyprus

- sources 1 Eus. *Hieron. Chron.* 188; Oros. *Hist.* 7.9.11
sources 2 *Orac. Sibyll.* 4.128; Georg. *Sync.* 647
catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Ben-Menahem (1979); Guidoboni (1989)

This earthquake is recorded in late but reliable sources. The *Chronicon* of Eusebius records that an earthquake struck Cyprus: "Three towns in Cyprus were reduced to ruins by an earthquake".

Tres civitates Cypri terrae motu conruerunt.

Paulus Orosius writes: "In the ninth year of the reign [of Vespasian], three towns in Cyprus were reduced to ruins in an earthquake, and there was a great plague in Rome".

Nono autem imperii eius anno tres civitates Cypri terrae motu corruerunt et Romae magna pestilentia fuit.

<102> 24-26 August 79 ●Herculaneum, ●Miseno, ●Naples, ●Nocera Inferiore, ●Nola, ●Pompeii, ●Salerno, ●Sorrento, ●Stabia ▷eruption of Vesuvius, seismic sea-wave◁

- sources Plin. *min. ep.* 6.16, 6.20; Suet. *Tit.* 8.3-4; Dio Cass. 66.21.1-24.1
inscriptions *CIL* 10.1481 = *IG* 14.729 = *IGR* 1.435; *AE* 1902, 40; Simonelli (1972); Johannowsky (1986); *AE* 1951, 200, reinterpreted by Paci (1991)
literature Mommsen (1869); Ruggiero (1879); de Rossi M.S. (1879 b); Sogliano (1901); Baratta (1936); de Vos and de Vos (1982); Burnand (1984); Widemann (1986); Eco (1987); *Catalogo epigrafico* (1989); Luisi (1989); Pappalardo (1990); Schönberger (1990); Cioni *et al.* (1992); Renna (1992)
catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); Mallet (1853); von Hoff (1840); Capocci (1861); Schmidt (1881); Mercalli (1883); Baratta (1901); Carrozzo *et al.* (1973); Caputo and Faita (1984); Guidoboni (1989)

The famous eruption of Vesuvius on 24 August 79 A.D. destroyed a number of towns in Campania, and was accompanied by appreciable earth tremors. We have therefore examined the sources, but without going beyond what is useful for the purposes of estimating the seismic effects.

Two letters written to Tacitus by Pliny the Younger and published about 106 or 107 A.D. (Mommsen 1869, pp.107-8), describe the circumstances surrounding the death of his scholarly uncle Pliny the Elder, who was killed at Stabiae by the eruption, and they also tell of the effects of the earthquake (textual bibliography in Schönberger 1990).

In the first letter (6.16), Pliny the Younger writes: "To Cornelius Tacitus.

Thank you for asking me to send you a description of my uncle's death so that you can

and denser than any night that ever was, which they relieved by lighting torches and various kinds of lamp. My uncle decided to go down to the shore and investigate on the spot the possibility of any escape by sea, but he found the waves still wild and dangerous. A sheet was spread on the ground for him to lie down, and he repeatedly asked for cold water to drink. Then the flames and smell of sulphur which gave warning of the approaching fire drove the others to take flight and roused him to stand up. He stood leaning on two slaves and then suddenly collapsed, I imagine because the dense fumes choked his breathing by blocking his windpipe which was constitutionally weak and narrow and often inflamed. When daylight returned on the 26th — two days after the last day he had seen — his body was found intact and uninjured, still fully clothed and looking more like that of a man asleep than dead.

Meanwhile my mother and I were at Misenum, but this is not of any historic interest, and you only wanted to hear about my uncle's death. I will say no more, except to add that I have described in detail every incident which I either witnessed myself or heard about immediately after the event, when reports were most likely to be accurate. It is for you to select what best suits your purpose, for there is a great difference between a letter to a friend and history written for all to read".

C. Plinius Tacito Suo S.

Petis ut tibi avunculi mei exitum scribam, quo verius tradere posteris possis. Gratias ago; nam video morti eius si celebretur a te immortalem gloriam esse propositam. Quamvis enim pulcherrimarum clade terrarum, ut populi ut urbes memorabili casu, quasi semper victurus occiderit, quamvis ipse plurima opera et mansura condiderit, multum tamen perpetuitati eius scriptorum tuorum aeternitas addet. Equisdem beatos puto, quibus deorum munere datum est aut facere scribenda aut scribere legenda, beatissimos vero quibus utrumque. Horum in numero avunculus meus et suis libris et tuis erit. Quo libentius suscipio, depono etiam quod iniungis.

Erat Miseni classemque imperio praesens regebat. Nonum kal. Septembres hora fere septima mater mea indicat ei adparere nubem inusitata et magnitudine et specie. Usus ille sole, mox frigida, gustaverat iacens studebatque; poscit soleas, ascendit locum ex quo maxime miraculum illud conspici poterat. Nubes — incertum procul intuentibus ex quo monte (Vesuvium fuisse postea cognitum est) — oriebatur, cuius similitudinem et formam non alia magis arbor quam pinus expresserit. Nam longissimo velut trunco elata in altum quibusdam ramis diffundebatur, credo quia recenti spiritu evecta, dein senescente eo destituta aut etiam pondere suo victa in latitudinem vanescebat, candida interdum, interdum sordida et maculosa prout terram cineremve sustulerat. Magnum propiusque noscendum ut eruditissimo viro visum. Iubet liburnicam aptari; mihi si venire una vellem facit copiam; respondi studere me malle, et forte ipse quod scriberem dederat. Egrediebatur domo; accipit codicillos Rectinae Tasci imminenti periculo exterritae (nam villa eius subiacebat, nec ulla nisi navibus fuga): ut se tanto discrimini eriperet orabat. Vertit ille consilium et quod studioso animo incohaverat obit maximo. Deducit quadriremes, ascendit ipse non Rectinae modo sed multis (erat enim frequens amoenitas orae) laturus auxilium. Properat illuc unde alii fugiunt, rectumque cursum recta gubernacula in periculum tenet adeo solutus metu, ut omnes illius mali motus omnes figuras ut deprenderat oculis dictaret enotaretque.

Iam navibus cinis incidebat, quo propius accederent, calidior et densior; iam pumices etiam nigrique et ambusti et fracti igne lapides; iam vadum subitum ruinaque montis litora obstantia. Cunctatus paulum an retro flecteret, mox gubernatori ut ita faceret monenti "Fortes" inquit "fortuna iuvat: Pomponianum pete". Stabiis erat diremptus sinu medio (nam sensim circumactis curvatisque litoribus mare infunditur); ibi quamquam nondum periculo adpropinquante, conspicuo tamen et cum cresceret proximo, sarcinas contulerat in naves, certus fugae si contrarius ventus resedisset. Quo tunc avunculus meus secundissimo invecus, complectitur trepidantem consolatur hortatur,

at that distance from which mountain the cloud was rising (it was afterwards found to be Vesuvius); its general appearance can best be expressed as being like a pine rather than any other tree, for it rose to a great height on a sort of trunk and then split off into branches, I imagine because it was thrust upwards by the first blast and then left unsupported as the pressure subsided, or else it was borne down by its own weight so that it spread out and gradually dispersed. Sometimes it looked white, sometimes blotched and dirty, according to the amount of soil and ashes it carried with it. My uncle's scholarly acumen saw at once that it was important enough for a closer inspection, and he ordered a fast boat to be made ready, telling me I could come with him if I wished. I replied that I preferred to go on with my studies, and as it happened he had himself given me some writing to do.

As he was leaving the house he was handed a message from Rectina, wife of Tascius, whose house was at the foot of the mountain, so that escape was impossible except by boat. She was terrified by the danger threatening her and implored him to rescue her from her fate. He changed his plans, and what he had begun in a spirit of inquiry he completed as a hero. He gave orders for the warships to be launched and went on board himself with the intention of bringing help to many more people besides Rectina, for this lovely stretch of coast was thickly populated. He hurried to the place which everyone else was hastily leaving, steering his course straight for the danger zone. He was entirely fearless, describing each new movement and phase of the portent to be noted down exactly as he observed them. Ashes were already falling, hotter and thicker as the ships drew near, followed by bits of pumice and blackened stones, charred and cracked by the flames: then suddenly they were in shallow water, and the shore was blocked by the debris from the mountain. For a moment my uncle wondered whether to turn back, but when the helmsman advised this he refused, telling him that Fortune stood by the courageous and they must make for Pomponianus at Stabiae. He was cut off there by the breadth of the bay (for the shore gradually curves round a basin filled by the sea) so that he was not as yet in danger, though it was clear that this would come nearer as it spread. Pomponianus had therefore already put his belongings on board ship, intending to escape if the contrary wind fell. This wind was of course full in my uncle's favour, and he was able to bring his ship in. He embraced his terrified friend, cheered and encouraged him, and thinking he could calm his fears by showing his own composure, gave orders that he was to be carried to the bathroom. After his bath he lay down and dined; he was quite cheerful, or at any rate pretended to be, which was no less courageous.

Meanwhile on Mount Vesuvius broad sheets of fire and leaping flames blazed at several points, their bright glare emphasized by the darkness of night. My uncle tried to allay the fears of his companions by repeatedly declaring that these were nothing but bonfires left by the peasants in their terror, or else empty houses on fire in the districts they had abandoned. Then he went to rest and certainly slept, for as he was a stout man his breathing was rather loud and heavy and could be heard by people coming and going outside his door. By this time the courtyard giving access to his room was full of ashes mixed with pumice-stones, so that its level had risen, and if he had stayed in the room any longer he would never have got out. He was wakened, came out and joined Pomponianus and the rest of the household who had sat up all night. They debated whether to stay indoors or take their chance in the open, for the buildings were now shaking with violent shocks, and seemed to be swaying to and fro as if they were torn from their foundations. Outside, on the other hand, there was the danger of falling pumice-stones, even though these were light and porous; however, after comparing the risks they chose the latter. In my uncle's case one reason outweighed the other, but for the others it was a choice of fears. As a protection against falling objects they put pillows on their heads tied down with cloths.

Elsewhere there was daylight by this time, but they were still in darkness, blacker

still asleep. We sat down in the forecourt of the house, between the buildings and the sea close by. I don't know whether I should call this courage or folly on my part (I was only seventeen at the time) but I called for a volume of Livy and went on reading as if I had nothing else to do. I even went on with the extracts I had been making. Up came a friend of my uncle's who had just come from Spain to join him. When he saw us sitting there and me actually reading, he scolded us both — me for my foolhardiness and my mother for allowing it. Nevertheless, I remained absorbed in my book.

By now it was dawn, but the light was still dim and faint. The buildings round us were already tottering, and the open space we were in was too small for us not to be in real and imminent danger if the house collapsed. This finally decided us to leave the town. We were followed by a panic-stricken mob of people wanting to act on someone else's decision in preference to their own (an element in fear which is like prudence), who hurried us on our way by pressing hard behind in a dense crowd. Once beyond the buildings we stopped, and there we had some extraordinary experiences which thoroughly alarmed us. The carriages we had ordered to be brought out began to run in different directions though the ground was quite level, and would not remain stationary even when wedged with stones. We also saw the sea sucked away and apparently forced back by the earthquake: at any rate it receded from the shore so that quantities of sea creatures were left stranded on dry sand. On the landward side a fearful black cloud was rent by forked and quivering bursts of flame, and parted to reveal great tongues of fire, like flashes of lightning magnified in size.

At this point my uncle's friend from Spain spoke up still more urgently: 'If your brother, if your uncle is still alive, he will want you both to be saved; if he is dead, he would want you to survive him — so why put off your escape?' We replied that we would not think of considering our own safety as long as we were uncertain of his. Without waiting any longer, our friend rushed off and hurried out of danger as fast as he could.

Soon afterwards the cloud sank down to earth and covered the sea; it had already blotted out Capri and hidden the promontory of Misenum from sight. Then my mother implored, entreated, and commanded me to escape as best I could — a young man might escape, whereas she was old and slow and could die in peace as long as she had not been the cause of my death too. I told her I refused to save myself without her, and grasping her hand forced her to quicken her pace. She gave in reluctantly, blaming herself for delaying me. Ashes were already falling, not as yet very thickly. I looked round: a dense black cloud was coming up behind us, spreading over the earth like a flood. 'Let us leave the road while we can still see', I said, 'or we shall be knocked down and trampled underfoot in the dark by the crowd behind'. We had scarcely sat down to rest when darkness fell, not the dark of a moonless or cloudy night, but as if the lamp had been put out in a closed room. You could hear the shrieks of women, the wailing of infants, and the shouting of men; some were calling their parents, others their children or their wives, trying to recognize them by their voices. People bewailed their own fate or that of their relatives, and there were some who prayed for death in their terror of dying. Many besought the aid of the gods, but still more imagined there were no gods left and that the universe was plunged into eternal darkness for evermore. There were people, too, who added to the real perils by inventing fictitious dangers: some reported that part of Misenum had collapsed or another part was on fire, and though their tales were false they found others to believe them. A gleam of light returned, but we took this to be a warning of the approaching flames rather than daylight. However, the flames remained some distance off; then darkness came on once more and ashes began to fall again, this time in heavy showers. We rose from time to time and shook them off, otherwise we should have been buried and crushed beneath their weight. I could boast that not a groan or cry of fear escaped me in these perils, had I not derived some poor consolation in my mortal

lot from the belief that the whole world was dying with me and I with it. At last the darkness thinned and dispersed into smoke or cloud; then there was genuine daylight, and the sun actually shone out, but yellowish as it is during an eclipse. We were terrified to see everything changed, buried deep in ashes like snowdrifts. We returned to Misenum, where we attended to our physical needs as best we could, and then spent an anxious night alternating between hope and fear. Fear predominated, for the earthquakes went on, and several hysterical individuals made their own and other people's calamities seem ludicrous in comparison with their frightful predictions. But even then, in spite of the dangers we had been through and were still expecting, my mother and I had still no intention of leaving until we had news of my uncle.

Of course these details are not important enough for history, and you will read them without any idea of recording them; if they seem scarcely worth even putting in a letter, you have only yourself to blame for asking for them".

C. Plinius Tacito Suo S.

Ais te adductum litteris quas exigenti tibi de morte avunculi mei scripsi, cupere cognoscere, quos ego Miseni relictus (id enim ingressus abruperam) non solum metus verum etiam casus pertulerim. "Quamquam animus meminisse horret,... incipiam".

Profecto avunculo ipse reliquum tempus studiis (ideo enim remanseram) impendi; mox balineum cena somnus inquietus et brevis. Praecesserat per multos dies tremor terrae, minus formidolosus quia Campaniae solitus; illa vero nocte ita invaluit, ut non moveri omnia sed verti crederentur. Inrupit cubiculum meum mater; surgebam invicem, si quiesceret excitaturus. Resedimus in area domus, quae mare a tectis modico spatio dividebat. Dubito, constantiam vocare an imprudentiam debeam (agebam enim duodevicensimum annum): posco librum Titi Livi, et quasi per otium lego atque etiam ut coeperam excerpto. Ecce amicus avunculi qui nuper ad eum ex Hispania venerat, ut me et matrem sedentes, me vero etiam legentem videt, illius patientiam securitatem meam corripit. Nihilo segnius ego intentus in librum.

Iam hora diei prima, et adhuc dubius et quasi languidus dies. Iam quassatis circumiacentibus tectis, quamquam in aperto loco, angusto tamen, magnus et certus ruinae metus. Tum demum excedere oppido visum; sequitur vulgus attonitum, quodque in pavore simile prudentiae, alienum consilium suo praefert, ingentique agmine abeuntes premit et impellit. Egressi tecta consistimus. Multa ibi miranda, multas formidines patimur. Nam vehicula quae produci iusseramus, quamquam in planissimo campo, in contrarias partes agebantur, ac ne lapidibus quidem fulta in eodem vestigio quiescebant. Praeterea mare in se resorberi et tremore terrae quasi repelli videbamus. Certe processerat litus, multaque animalia maris siccis harenis detinebat. Ab altero latere nubes atra et horrenda, ignei spiritus tortis vibratisque discursibus rupta, in longas flammularum figuras dehiscebat; fulguribus illae et similes et maiores erant. Tum vero idem ille ex Hispania amicus acrius et instantius "Si frater" inquit "tuus, tuus avunculus vivit, vult esse vos salvos; si periit, superstites voluit. Proinde quid cessatis evadere?" Respondimus non commissuros nos ut de salute illius incerti nostrae consulere-mus. Non moratus ultra proripit se effusoque cursu periculo aufertur. Nec multo post illa nubes descendere in terras, operire maria; cinxerat Capreas et absconderat, Miseni quod procurrit abstulerat. Tum mater orare hortari iubere, quoquo modo fugerem; posse enim iuvenem, se et annis et corpore gravem bene morituram, si mihi causa mortis non fuisset. Ego contra salvum me nisi una non futurum; dein manum eius amplexus addere gradum cogo. Paret aegre incusatque se, quod me moretur. Iam cinis, adhuc tamen rarus. Respicio: densa caligo tergis imminebat, quae nos torrentis modo infusa terrae sequebatur. "Deflectamus" inquam "dum videmus, ne in via strati comitantium turba in tenebris obteramur". Vix consideramus, et nox non qualis inlunis aut nubila, sed qualis in locis clausis lumine extincto. Audires ululatus femi-

narum, infantum quiritatus, clamores virorum; alii parentes alii liberos alii coniuges vocibus requirebant, vocibus noscitabant; hi suum casum, illi suorum miserabantur; erant qui metu mortis mortem precarentur; multi ad deos manus tollere, plures nusquam iam deos ullos aeternamque illam et novissimam noctem mundo interpreta- bantur. Nec defuerunt qui fictis mentitisque terroribus vera pericula auferent. Aderant qui Miseni illud ruisse illud ardere falso sed credentibus nuntiabant. Paulum reluxit, quod non dies nobis, sed adventantis ignis indicium videbatur. Et ignis quidem longius substitit; tenebrae rursus cinis rursus, multus et gravis. Hunc identidem adsurgentes excutiebamus; operti alioqui atque etiam oblisi pondere esse- mus. Possem gloriari non gemitum mihi, non vocem parum fortem in tantis periculis excidisse, nisi me cum omnibus, omnia mecum perire misero, magno tamen mortalita- tis solacio credidissem.

Tandem illa caligo tenuata quasi in fumum nebulamve discessit; mox dies verus; sol etiam effulsit, luridus tamen qualis esse cum deficit solet. Occursabant trepidantibus adhuc oculis mutata omnia altoque cinere tamquam nive obducta. Regressi Misenum curatis utcumque corporibus suspensam dubiamque noctem spe ac metu exegimus. Metus praevalebat; nam et tremor terrae perseverabat, et plerique lymphati terrificis vaticinationibus et sua et aliena mala ludificabantur. Nobis tamen ne tunc quidem, quamquam et expertis periculum et expectantibus, abeundi consilium, donec de avun- culo nuntius.

Haec nequaquam historia digna non scripturus leges et tibi scilicet qui requisisti impu- tabis, si digna ne epistula quidem videbuntur. Vale.

In his rhetorical conclusion, Pliny makes the point that local events like these could have no place in a historical work unless they were reduced to the succinct form appro- priate to annals.

Dio Cassius also mentions the earthquakes which occurred during the eruption, tell- ing of thunderous subterranean rumblings and other noises, nearer the surface, that resembled the bellowing of animals: "In Campania remarkable and frightful occur- rences took place; for a great fire suddenly flared up at the very end of the summer. It happened like this. Mt. Vesuvius stands over against Neapolis near the sea and it has inexhaustible fountains of fire. Once it was equally high at all points and the fire rose from the centre; for here only have fires broken out, whereas all the outer parts of the mountain remain even now untouched by fire. Consequently, as the outside is never burned, while the central part is constantly growing brittle and being reduced to ashes, the peaks surrounding the centre retain their original height to this day, but the whole section that is on fire, having been consumed, has in the course of time set- tled and therefore become concave; thus the entire mountain resembles an amphithea- tre — if we may compare great things to small. Its outlying heights support both trees and vines in abundance, but the crater is given over to the fire and sends up smoke by day and flames by night; in fact, it gives the impression that quantities of incense of all kinds are being burned in it. This, now, goes on all the time, sometimes to a great- er, sometimes to a less extent; but often the mountain throws up ashes, whenever there is an extensive settling in the interior, and discharges stones whenever it is rent by a violent blast of air. It also rumbles and roars because its vents are not all group- ed together but are narrow and concealed.

Such is Vesuvius, and these phenomena usually occur there every year. But all the other occurrences that had taken place there in the course of time, however notable they may have seemed to those who on each occasion observed them, on account of their rarity, would nevertheless be regarded as trivial in comparison with what now happened, even if all had been combined into one. This is what happened. Numbers of huge men quite surpassing any human stature — such creatures, in fact, as the Giants are pictured to have been — appeared, now on the mountain, now in the sur-

rounding country, and again in the cities, wandering over the earth day and night and also flitting through the air. After this, fearful droughts and sudden and violent earthquakes occurred, so that the whole plain round about seethed and the summits leaped into the air. There were frequent rumblings, some of them subterranean, that resembled thunder, and some on the surface, that sounded like bellowings; the sea also joined in the roar and the sky re-echoed it. Then suddenly a portentous crash was heard, as if the mountains were tumbling in ruins; and first huge stones were hurled aloft, rising as high as the very summits, then came a great quantity of fire and endless smoke, so that the whole atmosphere was obscured and the sun was entirely hidden, as if eclipsed. Thus day was turned into night and light into darkness. Some thought that the Giants were rising again in revolt (for at this time too, many of their forms could be discerned in the smoke, and a sound as of trumpets was also heard), while others believed that the whole universe was being resolved into chaos or fire. Therefore they fled, some from the houses into the streets, others from outside into the houses, now from the sea to the land and now from the land to the sea; for in their excitement they regarded any place where they were not as safer than where they were. While this was going on, an inconceivable quantity of ashes was blown out, which covered both sea and land and filled all the air. It wrought much injury of various kinds, as chance befell, to men and farms and cattle, and in particular it destroyed all fish and birds. Furthermore, it buried two entire cities, Herculaneum and Pompeii, the latter place while its populace was seated in the theatre. Indeed, the amount of dust, taken all together, was so great that some of it reached Africa and Syria and Egypt, and it also reached Rome, filling the air overhead and darkening the sun. There, too, no little fear was occasioned, and it lasted for several days, since the people did not know and could not imagine what had happened, but, like those close at hand, believed that the whole world was being turned upside down, that the sun was disappearing into the earth and that the earth was being lifted to the sky. These ashes, now, did the Romans no great harm at the time, though later they brought a terrible pestilence upon them. However, a second conflagration, above ground, in the following year spread over very large sections of Rome, while Titus was absent in Campania attending to the catastrophe which had befallen that region".

Ἐν δὲ τῇ Καμπανίᾳ φοβερὰ τινα καὶ θαυμαστὰ συνηνέχθη· πῦρ γὰρ μέγα κατ' αὐτὸ τὸ φθινόπωρον ἑξαπινάϊως ἐξήφθη. τὸ γὰρ ὄρος τὸ Βέσβιον ἔστι μὲν πρὸς τῇ θαλάσῃ κατὰ Νέαν πόλιν, ἔχει δὲ πυρὸς πηγὰς ἀφθόγους. καὶ ἦν μὲν ποτε πᾶν ὁμοίως ὑψηλόν, καὶ ἀπ' αὐτοῦ μέσου τὸ πῦρ ἀνέτελλε· ταύτῃ γὰρ πεπύρωται μόνον, τὰ δὲ ἔξωθεν αὐτοῦ πάντα ἄπυρα καὶ νῦν ἔτι διαμένει. ἐκ δὲ τούτου, ἐκείνων μὲν ἀκαύστων αἰεὶ ὄντων, τῶν δὲ ἐν τῷ μέσῳ κραυρουμένων καὶ τεφρουμένων, αἱ μὲν πέριξ κορυφαὶ τὸ ἀρχαῖον ὕψος ἐς δεῦρο ἔχουσι, τὸ δὲ ἔμπυρον πᾶν δαπανηθὲν ἐν τῷ χρόνῳ κοῖλον ἐκ τοῦ συνίειν γέγονεν, ὥστε κυνηγετικῷ τινι θεάτρῳ τὸ ὄρος σύμπαν, ὡς μικρὰ μεγάλους εἰκάσαι, εἰκέναι. καὶ αὐτοῦ τὰ μὲν ἄκρα καὶ δένδρα καὶ ἀμπέλους πολλὰς ἔχει, ὁ δὲ δὴ κύκλος ἀνείται τῷ πυρί, καὶ ἀναδίδωσι τῆς μὲν ἡμέρας καπνὸν τῆς δὲ νυκτὸς φλόγα, ὥστε δόξαι πολλὰ ἐν αὐτῷ καὶ παντοδαπὰ θυμιάσθαι θυμιάματα. καὶ τοῦτο μὲν οὕτως αἰεὶ, ποτὲ μὲν ἐπὶ μᾶλλον ποτὲ δὲ ἐπὶ ἥττον, γίνεται· πολλάκις δὲ καὶ τέφραν ἀναβάλλει, ὅταν ἀθρόον τι ὑφίζησιν, καὶ λίθους ἀναπέμψει, ὅταν ὑπὸ πνεύματος ἐκβιασθῇ. ἤχει τε καὶ βοᾶ, ἅτε μὴ συμπεπιλημένας ἀλλ' ἀραιὰς καὶ λαθραίας τὰς ἀναπνοὰς ἔχων.

Τοιοῦτον μὲν τὸ Βέσβιον ἔστι, καὶ ταῦτα ἐν αὐτῷ κατ' ἔτος ὡς πλήθει γίγνεται. ἀλλὰ τὰ μὲν ἄλλα ὅσα ἐκείνῳ ἐν τῷ χρόνῳ συνηνέχθη, εἰ καὶ μεγάλα παρὰ τὸ καθεστηκὸς τοῖς αἰεὶ ὀρώσιν αὐτὰ εἶναι ἔδοξε, σμικρὰ ἂν πρὸς τὰ τότε συμβάντα, καὶ τὰ πάντα ἐς ἓν συναχθέντα, νομισθεῖν. ἔσχε γὰρ οὕτως. ἄνδρες πολλοὶ καὶ μεγάλοι, πᾶσαν τὴν ἀνθρωπίνην φύσιν ὑπερβεβληκότες, οἷοι οἱ γίγαντες γράφονται, τοῦτο μὲν ἐν τῷ ὄρει τοῦτο δ' ἐν τῇ περὶ αὐτὸ χώρα ταῖς τε πόλεσι μεθ' ἡμέραν καὶ νύκτωρ

ἐν τῇ γῇ περινοστοῦντες καὶ ἐν τῷ ἀέρι διαφοιτῶντες ἐφαντάζοντο. καὶ μετὰ τοῦτ' αὐχμοὶ τε δεινοὶ καὶ σεισμοὶ ἐξαίφνης σφοδροὶ ἐγίνοντο, ὥστε καὶ τὸ πεδῖον ἐκεῖνο πᾶν ἀναβράττεσθαι καὶ τὰ ἄκρα ἀναπηδᾶν. ἡχαί τε αἱ μὲν ὑπόγειοι βρονταῖς ἔοικυῖαι αἱ δὲ καὶ ἐπίγειοι μυκηθμοῖς ὅμοιοι συνέβαινον, καὶ ἢ τε θάλασσα συνέβρεμε καὶ ὁ οὐρανὸς συνεπήχει. κακὸν τούτου κτύπος τε ἐξαίσιος ἐξαπινάίως ὥς καὶ τῶν ὁρῶν συμπιπτόντων ἐξηκούσθη, καὶ ἀνέθορον πρῶτον μὲν λίθοι ὑπερμεγέθεις, ὥστε καὶ ἐς αὐτὰ τὰ ἄκρα ἐξικέσθαι, ἔπειτα πῦρ πολὺ καὶ καπνὸς ἅπλετος, ὥστε πάντα μὲν τὸν ἀέρα συσκιασθῆναι, πάντα δὲ τὸν ἥλιον συγκρυφθῆναι καθάπερ ἐκλελοιπότα. νύξ τε οὖν ἐξ ἡμέρας καὶ σκότος ἐκ φωτὸς ἐγένετο· καὶ ἐδόκουν οἱ μὲν τοὺς γίγαντας ἐπανίστασθαι (πολλὰ γὰρ καὶ τότε εἰδῶλα αὐτῶν ἐν τῷ καπνῷ διεφαίνετο, καὶ προσέτι καὶ σαλπίγγων τις βοή ἠκούετο), οἱ δὲ καὶ ἐς χάος ἢ καὶ πῦρ τὸν κόσμον πάντα ἀναλίσκεσθαι. καὶ διὰ ταῦτ' ἔφυγον οἱ μὲν τῶν οἰκιῶν ἐς τὰς ὁδοὺς οἱ δὲ ἔξωθεν εἴσω, ἔκ τε τῆς θαλάσσης ἐς τὴν γῆν καὶ ἐξ ἐκείνης ἐς τὴν θάλασσαν, οἷα τεταραγμένοι καὶ πᾶν τὸ ἀπὸ σφῶν ἀπὸν ἀσφαλέστερον τοῦ παρόντος ἠγούμενοι. ταῦτά τε ἅμα ἐγίνετο, καὶ τέφρα ἀμύθητος ἀνεφυσήθη καὶ τὴν τε γῆν τὴν τε θάλασσαν καὶ τὸν ἀέρα πάντα κατέσχε, καὶ πολλὰ μὲν καὶ ἄλλα, ὥς που καὶ ἔτυχε, καὶ ἀνθρώποις καὶ χώραις καὶ βοσκήμασιν ἐλυμήνατο, τοὺς δὲ δὴ ἰχθύας τὰ τε ὄρνεα πάντα διέφθειρε, καὶ προσέτι καὶ πόλεις δύο ὅλας, τὸ τε Ἑρκουλάνεον καὶ τοὺς Πομπηίους, ἐν θεάτρῳ τοῦ ὁμίλου αὐτῆς καθημένου, κατέχωσε. τοσαύτη γὰρ ἡ πᾶσα κόνις ἐγένετο ὥστ' ἀπ' αὐτῆς ἦλθε μὲν καὶ ἐς Ἀφρικὴν καὶ ἐς Συρίαν καὶ ἐς Αἴγυπτον, ἦλθε δὲ καὶ ἐς τὴν Ῥώμην, καὶ τὸν τε ἀέρα τὸν ὑπὲρ αὐτῆς ἐπλήρωσε καὶ τὸν ἥλιον ἐπεσκίασε. καὶ συνέβη κἄνταῦθα δέος οὐ μικρὸν ἐπὶ πολλὰς ἡμέρας οὐτ' εἰδόσι τοῖς ἀνθρώποις τὸ γεγονὸς οὐτ' εἰκάσαι δυναμένοις, ἀλλ' ἐνόμιζον καὶ ἐκεῖνοι πάντα ἄνω τε καὶ κάτω μεταστρέφεσθαι, καὶ τὸν μὲν ἥλιον ἐς τὴν γῆν ἀφανίζεσθαι, τὴν δὲ γῆν ἐς τὸν οὐρανὸν ἀνίεναι. ἡ μὲν οὖν τέφρα αὕτη οὐδὲν μέγα τότε κακὸν αὐτοὺς εἰργάσατο (ὑστερον γὰρ νόσον σφίσι λοιμώδη δεινὴν ἐνέβαλε). πῦρ δὲ δὴ ἕτερον ἐπίγειον τῷ ἔξῃς ἔτει πολλὰ πᾶν τῆς Ῥώμης, τοῦ Τίτου πρὸς τὸ πάθημα τὸ ἐν τῇ Καμπανίᾳ γενόμενον ἐκδημήσαντος, ἐπενείματο.

Dio Cassius says that the emperor Titus (79-81 AD.) was away from Rome during the fire of 80 AD., because he was visiting the region which had suffered from the eruption of Vesuvius. This is important evidence of the emperor's personal presence at the scene of the disaster: something which the literary sources rarely point out. He entrusted to some men of consular rank the task of taking action in Campania, and arranged for the assets of those who had died in the disaster to be used for reconstruction purposes in the towns around Vesuvius.

Suetonius records: "During his reign [that of Titus] a number of unexpected disasters occurred, such as the eruption of Mt. Vesuvius in Campania, a fire in Rome which lasted for three days and nights, and an unusually serious plague. Faced with so many serious adversities, he showed not only the solicitude of an emperor, but also a striking fatherly compassion, for he issued edicts to bring aid, and helped out as much as he could from his own resources. He drew lots amongst those of consular rank to decide who should be in charge of relief work in Campania, and arranged for the assets of those victims of Vesuvius who had no surviving heirs to be used for the restoration of the afflicted towns".

Quaedam sub eo fortuita ac tristia acciderunt, ut conflagratio Vesuvii montis in Campania, et incendium Romae per triduum totidemque noctes, item pestilentia quanta non temere alias. In iis tot adversis ac talibus non modo principis sollicitudinem sed et parentis affectum unicum praestitit, nunc consolando per edicta, nunc opitulando quatenus suppeteret facultas. Curatores restituendae Campaniae e consularium numero sorte duxit; bona oppressorum in Vesuvio, quorum heredes non extabant, restitutioni afflictarum civitatum attribuit.

On the basis of Pliny the Younger's detailed letters, it has been possible to reconstruct a chronological sequence of events for the eruption and accompanying earthquake tremors (Luisi 1989, p.229):

24 August 79	12 noon	Explosion	25 August	dawn	Misenum: earthquake. Pliny the Younger leaves the town
	1 p.m.	Dark cloud visible from Misenum			
	afternoon	Pliny the Elder sets off by boat from Misenum towards Herculaneum Pompeii is buried in ash and pumice Ash and pumice rain on to the sea		morning	Misenum: earthquake
				afternoon	Misenum: ash starts falling
				night	Misenum: thick and heavy rain of ash
evening		Part of Mt.Vesuvius collapses in a landslide Herculaneum is buried in a pyroclastic flow Pliny changes course and heads for Stabiae A strong wind blows onshore from the sea	26 August	morning	Pliny the Younger returns to Misenum Pliny the Elder dies at Stabiae
				afternoon	Slight earthquake
night		Fire on Mt.Vesuvius		night	Last earthquake tremors
		Stabiae: ash, pumice and earthquake tremors			

On the basis of some archaeological finds, Pappalardo (1990, pp.209-11) has recently cast doubt on the traditional date of 24 August, and has gone back to 23 November — the date suggested in the nineteenth century (Ruggiero 1879). The finds seem to suggest that the eruption may have occurred in the late autumn. Thus there are, for example, the remains of grapes from prepared must, found in the country house of L.Crassus Tertius at Oplontis (de Vos and de Vos 1982, p.274); and pomegranates put to ripen between layers of matting were recently found at the same place by A.De Caro; and in addition, casts of dead bodies show clear traces of heavy clothing having been worn. In a balanced discussion of chronological problems connected with the dating of the eruption of Vesuvius, Renna (1992, pp.107-12; 118-21) recently showed that the more reliable codices of Pliny the Younger's letters give the date of the eruption as 24 August, whereas the month of November only appears in some of the first printed editions, at the end of the 15th and the beginning of the 16th century.

It is still difficult, therefore, to solve the problem of the conflict between what we might call the "textual" dating to 24 August and the "archaeological" dating, which suggests that the eruption occurred in the late autumn: October or November.

There are five inscriptions which provide evidence of repairs to damage caused by the earthquake tremors accompanying the eruption:

- 1) records building work carried out at Naples on the instructions of Titus in 80 and 81 AD;
- 2) comes from Piazza Tasso in Sorrento, and concerns the rebuilding of a clock, again on the instructions of Titus;
- 3) concerns the restoration of a small tetrastyle temple at Nola, carried out on the instructions of Titus;
- 4) has recently been carefully examined and interpreted by Paci (1991): it refers to restoration work ordered by Titus on an unidentified building at Salerno;
- 5) concerns restoration work carried out by Domitian on the theatre at Nocera Inferiore.

1) Naples. Inscription dating to 80-81 AD. (CIL 10.1481 = IG 14.729 = IGR 1.435; Baratta 1936, p.12; Burnand 1984, pp.174-5, no.3; *Catalogo epigrafi* 1989, pp.141-2). "[The emperor Titus Caesar] Vespasianus Augustus, son [of the *divus* Vespasia]nus, [pontifex maximus, on whom a tenth power as tribune has been conferred, emperor for

IMP TITVS CAESA
 VESPASIANI F VESPASI
 AVG PONT MAX TR PO
 COS IX CENSOR PP P P
 ORNAMENTI TERRAE MOTI

This inscription was found and is preserved at Sorrento. It records the repairs carried out by the emperor Titus to a public clock which was damaged in the earthquake of 79 A.D. and may also have been damaged in that of 62 A.D. (Sorrento, Museo Correale, photo Istituto Archeologico Germanico).

the fifteenth? time], consul for the eighth time, *censor*, father of the nation, restored [---] destroyed [by earthqua]kes”.

[Imp(erator) T(itus) Caesar divi Vespasia[ni] f(ilius) Vespasianus Aug(ustus), / [pont(ifex) max(imus), trib(unicia) potes(tate) x, imp(erator) xv?], co(n)s(ul) viii, censor, p(ater) p(atriciae), / [--- terrae motibus conlapsa restituit.

The inscription was discovered in 1538, and is engraved on a block of stone which is damaged on the right-hand side. It is now in the Museo Nazionale in Naples. The text is in two languages (Greek and Latin) and records the restoration of more than one building (as one can deduce from the neuter accusative plural *conlapsa* in the third line) which can no longer be identified. The work was carried out on the instructions of Titus between 1 July 80 and 30 June 81 A.D. — a time when the emperor held a tenth *tribunicia potestas*. As Burnand points out (1984, pp.174-5, no.3), it is not possible to establish whether the plural *terrae motibus* is a reference to the various tremors which accompanied the eruption of Vesuvius in 79 A.D., or to two or more separate earthquakes. In the latter case, it might refer not only to the earthquake of 79 but also to earlier ones, such as that which struck Naples in 64 A.D. (see entry <096>), and the one at Pompeii in 62 A.D. As Renna points out (1992, pp.93-4, note 199), however, it seems that this latter hypothesis must be rejected, because Seneca (*NQ* 6.1.2, see entry <095>) says that the earthquake of 62 did not damage public buildings in Naples. 2) Sorrento (Naples). Inscription dating to 80 A.D. (Sogliano 1901, pp.363-4; *AE* 1902, 40; Baratta 1936, p.12; *Catalogo epigrafi* 1989, p.142).

“The emperor Titus Caesar Vespasia[nus] Augustus son of the [*divus*] Vespasia[nus],

pontifex maximus, on whom a ninth power as tribune has been conferred, [emperor for the fifteenth? time], consul for the eighth time, *censor*, father of the nation, [restored, together with all] its ornaments, the cloc[k destroyed] by earthquakes”.

Imp(erator) Titus Caesar [divi] / Vespasiani f(ilius) Vespasia[nus] / Aug(ustus) pont(ifex) max(imus), tr(ibunicia) pot(estate) i[x, imp(erator) xv?], / co(n)s(ul) iix, censor, p(ater) p(atriciae) horologi[um cum suis] / ornamentis terrae motib[us conlapsum rest(ituit)].

This inscription again bears witness to steps taken by Titus to assist Campanian towns which had been damaged by the eruption of Vesuvius in 79 AD.

3) Nola. The inscription can be dated to the first half of the year 80 AD. (Simonelli 1972, pp.386-7).

“The emperor Titus Caesar [Vespasianus Augustus son] of the *divus* Vesp[asianus], *pontifex maximus*, on whom a tenth power as tribune has been conferred, emperor for the seventeenth time, consul for the eighth time, *censor*, father of the nation, [restored] the tetrastyle temple of the Genius of the colony [for it had been destroyed by] ear[thquakes]”.

Imp(erator) Titus Caesar divi Vesp[asiani f(ilius) Vespasianus Aug(ustus)], / pont(ifex) max(imus), trib(unicia) potest(ate) x, imp(erator) xvii, c(o)n(s)ul viii, censor, p(ater) p(atriciae)], / tetrastylum Geni coloniae ter[rae motibus conlapsum restituit].

The inscription is engraved on the remains of the entablature of a small tetrastyle temple, and is now in the entrance hall of the town hall at Nola. There is evidence in other inscriptions from Nola (CIL 10.1235, 1236) of the cult of the protective Genius referred to in this inscription.

4) Salerno. The inscription can be dated to between 1 July 79 and 30 June 80 AD. (AE 1951, 200; reinterpreted by Paci 1991).

“[The emperor Titus Cae]sar, [son of the *divus* Vespasianus, Vesp]asianus [Augustus, *pontifex maximus* (holding the)] power of tribune for the vi[III] time, [(acclaimed) emperor for the fifteenth time, elected consul for the seventh time, consul designate for the eighth (?) time], *censor*, father of the nation, restored [the ---] destroyed [by earthquakes?]”.

[Imp(erator) Titus C]aesar, [divi] / [Vespasiani f(ilius), Vesp]asianus [Aug(ustus)] / [pontif(ex) maxim(us), tribu]nic(ia) potest(ate) vi[III], / [imp(erator) xv, co(n)s(ul) vii, des(ignatus) viii (?),] censor, p(ater) p(atriciae) / [--- terrae mot. co]nlaps. restitu[it].

Earlier readings of the inscription (see Paci 1991, pp.692-8) interpreted line 5 differently. Paci has accepted Degraffi's earlier conjectures (see AE 1966, 72), and has contributed to the dating of the inscription on the basis of Titus' ninth power as tribune, which lasted from 1 July 79 to 30 June 80 AD. This establishes the link between restoration work carried out by Titus and the earthquakes which accompanied the eruption of Vesuvius.

5) Nuceria Alfaterna (Nocera Inferiore, in the Province of Salerno). The inscription dates to 82 AD. (Johannowsky 1986, pp.91-3, plate LIV; *Catalogo epigrafi* 1989, pp.142-3). “[The emperor Cae]sa[r] Domitianus Augustus, so[n] of the *divus* Vespasianus, *pontifex maximus*, on whom has been conferred a [second] power as tribune, [emperor for the second time, father of the nation, consul for eighth time], consul designate for the ninth time, [rest]ored the [--- t]heatr[e and --- which had collapsed] as a result of earthquakes”.

[Imp(erator) Ca]esa[r] Divi Vespasiani f[il](ius) / [[Domitianus]] Aug(ustus), pont(ifex) max(imus), trib(unicia) potest(ate) / [II, imp(erator) II, p(ater) p(atriciae), co(n)s(ul) viii,] designat(us) viii, [--- th]eatr[---] / [---]us terrae m[ot]ib[us] ---] / [restit]uit.

In line 4, *collapsa* or *concussa* may be supplied; in line 5 *[restit]uit* might be *[restaura]vit*. This engraved marble slab was found in the theatre at Nuceria Alfaterna. It records restoration work carried out by Domitian, and certainly refers to the theatre as well as to other unidentified buildings (Johannowsky suggests reading: *[duo th]eatr[a --- portic]us*) which were damaged in the earthquake tremors accompanying the eruption of Vesuvius in 79 AD. It may be that the expression *terrae motibus* refers, as in the case of the other inscriptions, to the earthquake of 62 as well as that of 79 AD.

⟨ 103 ⟩ **97 • Anazarbus, • Nicopolis (Cilicia)**

sources Mal. 267; *Suidas*, under *Anázarbos*

literature Zgusta (1981)

catalogues Guidoboni (1989)

Malalas mentions an earthquake at Diocaesarea and Nicopolis in Cilicia: "Diocaesarea, a city in Cilicia, suffered for a third time from the wrath of God, as did Nicopolis and its territory. The emperor [Nerva] therefore sent out a Roman senator named Zarbos to rebuild it, providing him with eight *centenaria*. When the senator Zarbos reached Cilicia and saw the destruction, he applied himself with great energy to the rebuilding of the city, making many improvements to it. And so the citizens expressed their gratitude by naming the city after him. He had previously called it Nerva, after the emperor Nerva".

Ἐπὶ δὲ τῆς αὐτοῦ βασιλείας ἔπαθεν ὑπὸ θεομηνίας τὸ τρίτον αὐτῆς πάθος Διοκαισάρεια, πόλις τῆς Κιλικίας, καὶ Νικουπόλις καὶ ἡ χώρα αὐτῆς. καὶ εὐθέως ἔπεμψε τινα ἐκεῖ ὁ αὐτὸς βασιλεὺς συγκλητικὸν Ῥωμαῖον ὀνόματι Ζάρβον εἰς τὸ κτίσαι αὐτὴν, παρασχὼν αὐτῷ ὀκτὼ κεντηνάρια. καὶ καταλαβὼν τὴν Κιλικίαν ὁ αὐτὸς Ζάρβος ὁ συγκλητικὸς, καὶ ἑωρακὼς τὰ πεπτωκότα, πολλὴν σπουδὴν θέμενος ἀνενέωσε τὴν πόλιν, βελτίω αὐτὴν ποιήσας. ὅθεν καὶ εἰς τὸ αὐτοῦ ὄνομα ἐκλήθη ἡ πόλις, τῶν πολιτῶν εὐχαριστούντων αὐτῷ. ὁ γὰρ συγκλητικὸς εἰς ὄνομα τοῦ βασιλέως Νερβᾶ ἐκάλεσεν αὐτὴν πόλιν Νερβάν.

Malalas goes on to say that the emperor died before rebuilding was completed. The city was subsequently called Anazarbus. It had originally been called Cyinda, but changed its name to Ciscus in republican times. At the time of Julius Caesar was renamed Diocaesarea. It took the name Anazarbus in the time of Nerva, after the earthquake described above.

The earthquake is also recorded in *Suidas*, according to whom it was a man named Anazarbus who was sent by Nerva. In our opinion the sources are in fact referring to the town of Anazarba or Anazarbus in Cilicia, near present day Ayşehoca in Turkey, which was also called "Caesarea by Anazarbus" from the time of Augustus onwards. The story of Zarbus (or Anazarbus) is in any case fiction. The general opinion is that the place name is related to similar Iranic place names (see Zgusta 1981, p.72).

⟨ 104 ⟩ **end of the 1st century • Pescolardo**

inscriptions *CIL* 9.1466

literature Burnand (1984); *Catalogo epigrafi* (1989)

catalogues Guidoboni (1989)

An inscription found at Pescolardo, near Circello, c.25 km north of Benevento, records the rebuilding of public baths which had collapsed as a result of an earthquake: "[The senate and] the people of the Baebian[i] [Ligu]rians set up [a statue?] to commemorate

the munificence of [...] under whose patronage and at whose expense the public baths which [co]llapsed as a result of an earthqua[ke] were rebuilt”.

[--- statuam? ---] patrono, qui [con]/lapsum terr[a]e mo[tu] / balineum reffici] / curavit ac sua [pe]/cunia fecit, ob mu/nificentiam eius / ordo et populus / [ligu]rum Baebian[o]/[r]um posuerunt.

The inscription records the rebuilding of the baths in a town of the Baebiani Ligurians by a *patronus* (whose name is not preserved) after an earthquake. The senate and people rewarded the generosity of the *patronus* by dedicating a statue to him. All that survives is the base, with this inscription (see the bibliography in *Catalogo epigrafi* 1989, pp.143-4).

The inscription cannot be dated more precisely than to the end of the first century AD. Burnand (1984, p.175, no.4) thinks it at least possible that the earthquake was one of those which occurred at the time of the 79 AD eruption of Vesuvius. In our view, however, such a link is impossible, because of the distance between this town and the area affected by the eruption and tremors of 79 AD.

< 105 > perhaps 2nd century • Aunobaris

inscriptions CIL 8.15562

literature Merlin (1944); *Catalogo epigrafi* (1989)

There is an inscription from Aunobaris (Henchir Kern el-Kebesch, c.10 km south of TebourSouk, Tunisia) in *Africa Proconsularis* which mentions the privately financed reconstruction of a building which had collapsed in an earthquake: “Sacred to [---]. [--- and Ser]vatus, sons (of Hilarus) [restored] at their own [expense] and dedicated [---], which was destroyed in an [ear]thquake, and which [H]ilarus [had built] from its foundations [and decorated] at his expense”.

[---] sacr(um). / [--- H]ilarus sua pecunia a solo //fecerat et exornaverat, per te]rrae motum dilabsum / [--- et Ser]vatus fili eiusdem sua / [pecunia restituerunt eid]emq(ue) dedicaverunt.

The small dimensions of the plaque (55 × 105 × 25 cm) suggest that the building concerned was some kind of small shrine or temple. The lack both of photographs and of archaeological data concerning the place where the inscription was found (it is not even mentioned by Merlin 1944 in *Inscriptions latines de la Tunisie*), makes it impossible to establish a more specific chronological context for the inscription, and hence for the earthquake mentioned in it.

< 106 > 2nd century • Interpromium

inscriptions CIL 9.3046 = ILS 5609

literature Burnand (1984); *Catalogo epigrafi* (1989); Varrasso (1989)

catalogues Guidoboni (1989)

There is a second century AD. inscription, now in the Abbey of San Clemente at Casauria, which records an earthquake and the subsequent complete reconstruction of the *ponderarium* (the building where the public weights were kept) in the village of Interpromium, near present-day San Valentino in Abruzzo Citeriore (Province of Pescara): “[Caius] Sulmonius Primus and [Caius] Sulmonius Fortunatus restored at their [o]wn expense the Public Weights Office belonging to the *pagus* of Interpromium, which had been destroyed by the [violence] of an earthquake”.

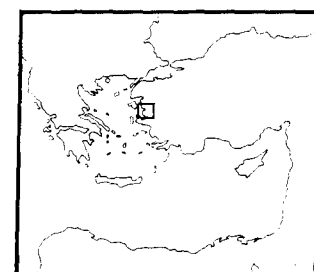
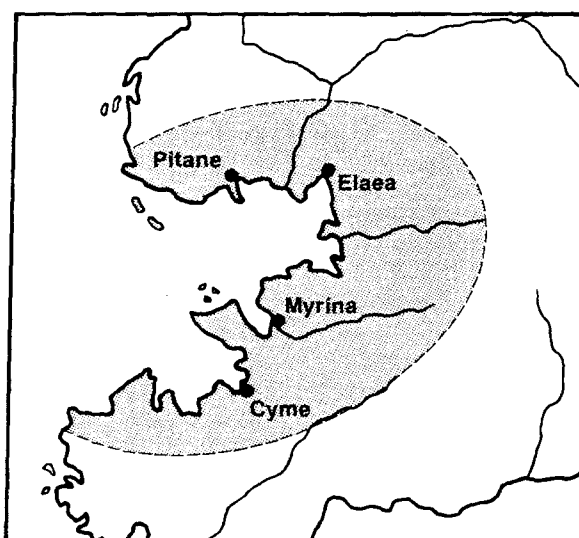


A 2nd century A.D. inscription referring to earthquake damage repairs at Interpromium.

The inscription is now in the abbey church of San Clemente a Casauria (photo A.A.Varrasso).

[C(aii)] *Sulmonii Primus et Fortunatus* / [p]onderarium pagi Interpromini, / [vi] *ter-*
rae motus dilapsum, a solo / [s]ua pecunia restituerunt.

Compared with the text published in *CIL*, the inscription is now even more defective (*Catalogo epigrafi* 1989, p.145). There is no other evidence for the earthquake mentioned in the inscription, and the text itself permits only a rough dating to the second century AD. See Burnand (1984, p.175, no.5) and Varrasso (1989, pp.402-3).



105

< 107 > **105 ●Cyme, ●Elaea, ●Myrina, ●Pitane**

sources 1 Eus. *Hieron. Chron.* 194d

sources 2 [Aur. Vict.] *Epit.* 13.12; Oros. *Hist.* 7.12.5; Georg. Sync. 655

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Hermann (1962); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

Our only evidence for this earthquake is a brief note in the Chronicle of Eusebius, which was written in the early 4th century but is nevertheless reliable.

Eusebius has brought together two separate earthquakes which occurred in the same period: the first struck the cities of Cyme, Elaea, Myrina and Pitane in Asia Minor;

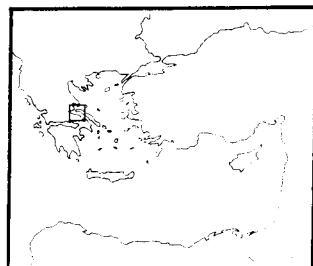
229

101-105 AD.

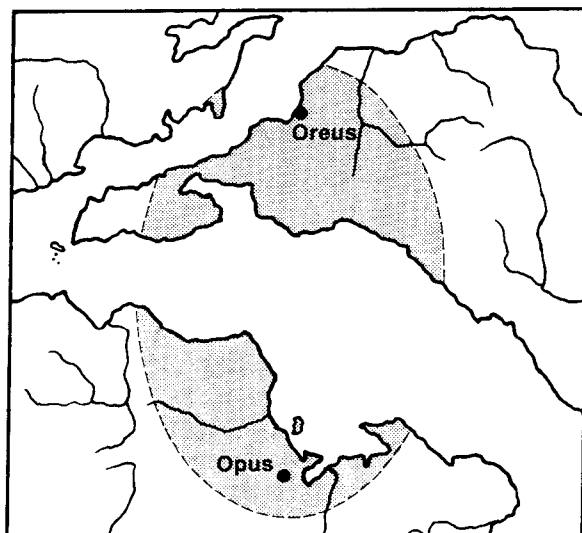
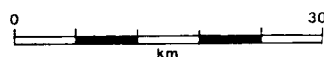
whereas the second struck Opus and Oreus in Greece. Eusebius writes: "Four cities in Asia were destroyed in an earthquake: Elaea, Myrina, Pitane and Cyme, as well as Opus and Oreus in Greece".

Terrae motu quattuor urbes Asiae subversae, Elaea Myrina Pitane Cyme, et Graeciae duae Opuntiorum et Oritorum.

Hermann (1962, col.1105) dates the earthquake to 106 AD, on the basis of Schöne's edition of Eusebius.



105



< 108 > **105 ●Opus, ●Oreus**

sources 1 Eus. *Hieron. Chron.* 194d

sources 2 [Aur. Vict.] *Epit.* 13.12; Oros. *Hist.* 7.12.5; Georg. Sync. 655

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Guidoboni (1989)

See entry < 107 >.

< 109 > **110 ●Galatia**

sources 1 Eus. *Hieron. Chron.* 195 b

sources 2 Oros. *Hist.* 7.12.5; Georg. Sync. 656

catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Grumel (1958); Hermann (1962); Comninakis and Papazachos (1982); Guidoboni (1989)

Our only evidence for this earthquake is a brief note in the *Chronicle* of Eusebius, which was written in the early 4th century but is nevertheless reliable. Eusebius writes: "Three cities of Galatia were destroyed in an earthquake".

Tres Galatiae civitates terraemotu erutae.

Paulus Orosius and Georgius Syncellus say exactly the same thing; but they combine two events by putting this earthquake together with that of 105 AD. (see entries < 107 > and < 108 >).

< 110 > **the morning of 13 December 115 • Antioch, O Mt.Casius
▷ landslide? ◁**

- sources 1 Dio Cass. 68.24, 25.6 = Zon. 11.22.18; Eus. *Hieron. Chron.* 196c; Mal. 275
sources 2 Oros. *Hist.* 7.12.5; Evagr. 2.12; Georg. Sync. 657
inscriptions CIL 14.4542
literature Schenk von Stauffenberg (1931); Downey (1961); Barbieri (1970); Burnand (1984);
Catalogo epigrafi (1989)
catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881);
Sieberg (1932 a); Hermann (1962); Ben-Menahem (1979); Guidoboni (1989)

Antioch was struck by a violent earthquake during a visit by Trajan, and some of his retinue were killed. Dio Cassius provides a detailed and dramatic description of its effects: "While he [Trajan] was visiting Antioch, there was an unusually powerful earthquake. Many cities were badly damaged, but Antioch suffered the worst destruction [...]. First of all there came a sudden bellowing roar, which was followed by a tremendous quaking, and the whole earth heaved up, so that even buildings were thrown into the air. Some came crashing back down in pieces, while others were tossed about as if by the surge of the sea, and their wreckage was scattered over large areas of open country. There was a fearful din of splitting and breaking timbers and tiles, and such vast quantities of dust arose that it was impossible to see or say or hear anything at all. Many people were hurt, even though some were outside their houses: they were snatched up, tossed violently about, and then dashed to the ground as though they had fallen from a cliff. Some were injured and others killed. Even trees, with all their roots, were thrown into the air. It was impossible to calculate the numbers of those who were trapped in their houses and killed [...] Even Mt.Casius was so badly shaken that its peaks seemed to lean over and break off, and to be falling right on the city".

Διατρίβοντος δὲ αὐτοῦ ἐν Ἀντιοχείᾳ σεισμός ἐξαίσιος γίνεται· καὶ πολλὰ μὲν ἑκαμον πόλεις, μάλιστα δὲ ἡ Ἀντιόχεια ἐδυστύχησεν [...] πρῶτον μὲν γὰρ μύκημα ἐξαπίνης μέγα ἐβρυχήσατο, ἔπειτα βρασμός ἐπ' αὐτῷ βιαιότατος ἐπεγένετο, καὶ ἄνω μὲν ἡ γῆ πάσας ἀνεβάλλετο, ἄνω δὲ καὶ τὰ οἰκοδομήματα ἀνεπήδα, καὶ τὰ μὲν ἀνέκαθεν ἐπαιρόμενα συνέπιπτε καὶ κατερρήγνυτο, τὰ δὲ καὶ δεῦρο καὶ ἐκείσε κλονούμενα ὥσπερ ἐν σάλῳ περιετρέπετο, καὶ ἐπὶ πολὺ καὶ τοῦ ὑπαίθρου προσκατελάμβανεν. ὁ τε κύπος θραυομένων καὶ καταγνυμένων ξύλων ὁμοῦ κεράμων λίθων ἐκπληκτικώτατος ἐγένετο, καὶ ἡ κόνις πλείστη ὅση ἠγείρετο, ὥστε μὴτε ἰδεῖν τινα μὴτε εἰπεῖν μὴτ' ἀκοῦσαι τι δύνασθαι. τῶν δὲ δὴ ἀνθρώπων πολλοὶ μὲν καὶ ἐκτὸς τῶν οἰκιῶν ὄντες ἐπόνησαν· ἀναβαλλόμενοι τε γὰρ καὶ ἀναρριπτούμενοι βιαίως, εἴθ' ὥσπερ ἀπὸ κρημνοῦ φερόμενοι προσηράσσοντο, καὶ οἱ μὲν ἐπηρεῦντο οἱ δὲ ἔθνησκον. καὶ τινα καὶ δένδρα αὐταῖς ρίζαις ἀνέθορε. τῶν δὲ ἐν ταῖς οἰκίαις καταληφθέντων ἀνεξεύρετος ἀριθμὸς ἀπώλετο [...] ἐσεισθῆ δὲ καὶ αὐτὸ τὸ Κάσιον οὕτως ὥστε τὰ ἄκρα αὐτοῦ καὶ ἐπικλίνεσθαι καὶ ἀπορρήγνυσθαι καὶ αὐτὴν τὴν πόλιν ἐσπίπτειν δοκεῖν.

Eusebius dates the earthquake to 113 AD. Malalas writes: "During the reign of the most sacred Trajan, Antioch the Great, near Daphne, suffered its third disaster, on Sunday 13 Apellaius/December, just after cockcrow in the year 164 according to the era of Antioch, two years after the arrival of the most sacred emperor Trajan in Anatolia. Those survivors who remained in the city built a temple at Daphne with this inscription: "Those who were saved erected this to Zeus the Saviour"."

Ἐπὶ δὲ τῆς βασιλείας τοῦ αὐτοῦ θειοτάτου Τραϊανοῦ ἔπαθεν Ἀντιόχεια ἡ μεγάλη ἡ πρὸς Δάφνην τὸ τρίτον αὐτῆς πάθος μηνὶ ἀπελλαίῳ τῷ καὶ δεκεμβρίῳ ιγ', ἡμέρᾳ α', μετὰ ἀλεκτρυόνα, ἔτους χρηματίζοντος ρξδ' κατὰ τοὺς αὐτοὺς Ἀντιοχεῖς, μετὰ δὲ β'

ἔτη τῆς παρουσίας τοῦ θειοτάτου βασιλέως Τραϊανοῦ τῆς ἐπὶ τὴν Ἀνατολήν. οἱ δὲ Ἀντιοχεῖς οἱ ἀπομείναντες καὶ ζήσαντες τότε ἱερὸν ἔκτισαν ἐν Δάφνῃ, ἐν ᾧ ἐπέγραψαν οἱ σωθέντες ἀνέστησαν Διὶ σωτῆρι.

There may be a reference to this earthquake at Antioch in the very incomplete Fragment xxxv in the *Fasti Ostienses*: "[---] Vestal virgin [---] there was an [earthqu]ake [---], of Quintus Asinius Mar[cellus ---]".

[---]rinu[---] / [---]ida v(irgo) V(estalis) [---] / [terrae m]otus fuit [---] / [---]m Q(uinti) Asini Mar[celli ---] / [---]+[---?] / -----.

Barbieri (1970, pp.263-5, 272-3, 276) has studied this much debated fragment and the substantial earlier bibliography in extreme detail, and suggests completing its five lines as set out below. He thinks the first line refers to a consul from the third and last pair for the year 115, namely Pompeius Macrinus — who is probably also referred to in the *Fasti Potentini* (from Potenza Picena, near Porto Recanati), though it, too, is a very fragmentary document: "[On the Calends of September] M. Pomp[ei]us Mac[rinu]s, ---". [k. Sept.] M. Pomp[ei]us Mac[rinu]s, ---].

The second line seems to refer to the death or sentencing of an unidentified Vestal virgin. Barbieri has suggested the *Lepida* in *CIL* 6.5477, but there are other possibilities, since the form of the first letter of the name suggests either an I or an N.

The earthquake referred to in the third line seems to be the one which struck Antioch in that same year 115, and it is probably recorded in the inscription because it caused the death of a number of people in the retinue of the emperor Trajan. It is unlikely, therefore, to be the hypothetical earthquake in the Ostia area — which is in any case not attested in any other sources — as previously suggested by Burnand (1984, pp.176-7, no.10) and in *Catalogo epigraphi* (1989, p.144).

The fourth and fifth lines are taken to record the death of the *praefectus urbi*, Q. Asinius Marcellus, and his replacement by Q. Baebius Macer: "Q. Baebius Macer was appointed to replace Q. Asinius Marcellus as *praefectus urbi*".

in locu]m Q. Asini Mar[celli praef. urb. f(actus) Q. Bae]bius Mace]r.

Barbieri has read the last letter of the fifth line as an R, whereas it had previously been interpreted as an A (*CIL* 14.4542) or an X.

< 111 > 117-138 Italy

sources 1 SHA, Had. 21.5-7

sources 2 Land. Sagax, *Hist. Rom.* 1.228

catalogues Guidoboni (1989)

The *Life of Hadrian* in the *Historia Augusta* records in very general terms that various disasters occurred during the reign of Hadrian (117-138 AD): "During his reign, there were famines, plagues and earthquakes. He did what he could to relieve the distress caused by all these disasters, and brought help to the many communities which had been devastated by them. He gave Latin citizenship to many communities, and exempted many from taxes".

Fuerunt eius temporibus fames pestilentia terrae motus, quae omnia, quantum potuit, procuravit multisque civitatibus vastatis per ista subvenit. fuit etiam Tiberis inundatio. Latium multis civitatibus dedit, tributa multis remisit.

In view of the generic nature of the passage from the *Historia Augusta* and the lack of other information, the only reasonable conclusion we can draw is that at some unidentified date during the reign of Hadrian, there may have been some earthquakes in Italy. Since the system of registering prodigies, which had resulted in the recording of

many seismic events in Italy, including minor ones, had now been abandoned, and since we also lack local chronicles or inscriptions of known date, we are unable to check the effective nature of these earthquakes. With few exceptions, the sources are silent on these matters in imperial times, and the situation is very similar in the sources relating to the western provinces of the Roman Empire, such as Gaul and Spain. We have to take due note of the striking difference between this situation and the rich documentation available for the eastern Mediterranean, and new strategies need to be worked out to enable us to draw a more accurate map of seismic events, using reliable archaeological data and taking into consideration the various stages of building and rebuilding.

< 112 > **120/128 •Aoria, •Cyzicus, •Nicaea, •Nicomedia**

▷ seismic sea-wave? ◁

- sources 1 Eus. *Hieron. Chron.* 198e; Mal. 279; *Chron. Pasch.* 254, 475; *Orac. Sibyll.* 3.436ff., 4.99-101; Paus. 2.7.1
- sources 2 Georg. Sync. 659; Cedren. 438
- inscriptions CIG 3293, 3352; Reinach (1890)
- literature Bate (1918); Ruge (1936); Robert (1978); Musti and Torelli (1986)
- catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Hermann (1962); Papazachos and Papazachos (1989); Guidoboni (1989)

That this earthquake struck Nicomedia appears from an inscription dating to imperial times (now in the Louvre), which was found on a stele (CIG 3293, 3352) erected by a certain Thraso in memory of his two young children and the man in charge of them, who were killed in the earthquake.

It reads as follows: "Thraso, son of Diogenes, erected this stele for his two sons, Dexiphanes aged five and Thraso aged four, and for Hermes, aged twenty-five, who was bringing them up. In the ruins caused by the earthquake he was embracing them like this".

Θράσωων Διογένους τήνδε ἀνέστησεν στυλ/λεῖδαν υἱῶν β', Δεξιφάνους ἐτῶν ε', Θράσωωνος / ἐτῶν δ', Ἑρμῇ θρέψαντος αὐτῶν κε'. ἐν τῇ συνπτώσει / τοῦ σεισμοῦ οὕτως αὐ/τὰ περιει/λήφει.

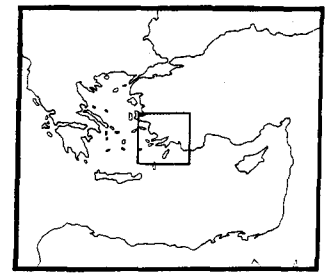
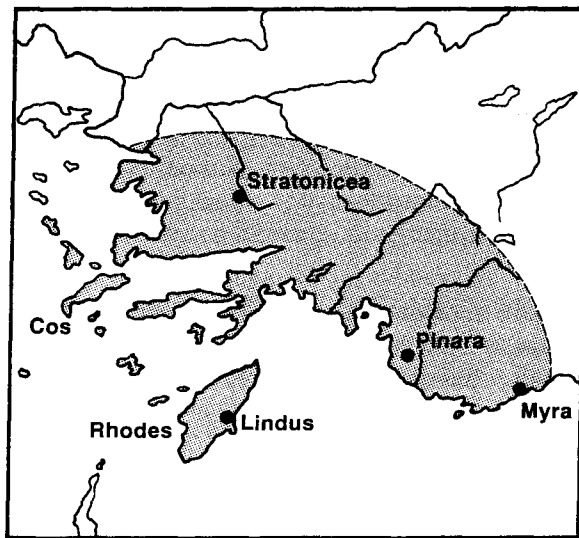
The young man is represented beside the two children in a square recess, and there is an eagle in the pediment. The city of Nicomedia was rebuilt and given the title Hadrianè to commemorate Hadrian's having been there; and some coins were also minted in which Hadrian is described as *Restitutor Nicomediae* (Robert 1978).

Eusebius also refers to collapses in Nicaea: "There was an earthquake, Nicomedia collapsed in ruins, and many parts of the city of Nicaea were destroyed. For their restoration, Hadrian gave generously from the public purse".

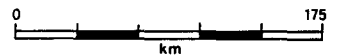
Terraemotu facto Nicomedia ruit, et Nicaenae urbis plurima eversa sunt: ad quarum instaurationem Hadrianus de publico est largitus impensas.

An inscription from Cyzicus in honour of Hadrian — which may be the result of seismic destruction — describes him as *sotér kai ktístes*, that is to say, saviour and founder (Reinach 1890).

There is a reference in Malalas to an earthquake striking the city of Cyzicus: "During the reign of the most sacred Hadrian (117-138 AD.), Cyzicus, which is the great capital city of the province of Hellespont, suffered an earthquake from the wrath of God on the night of 10 November. He gave generously to the city and restored it. He bestowed money and ranks on the surviving citizens".



142/144



(114) 142/144 ●Lindus, ●Myra, ●Pinara, ●Stratonicea,
●the island of Cos, ●the island of Rhodes, ●Caria, ●Lycia

sources Paus. 8.43.4; SHA AP 9.1

inscriptions IGR 3.739; IGR 4.1121; CIG 2721, 2.1108; Lindos 2.449

literature Bate (1918); Bowersock (1968); Robert (1978); Mitchell (1987)

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Sieberg (1932 a); Galanopoulos (1961); Hermann (1962); Ambraseys (1962 b); Shebalin *et al.* (1974); Ben-Menahem (1979); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

Pausanias writes: "The cities of Lycia and Caria and Cos and Rhodes were struck by a violent earthquake. The emperor Antoninus [Pius] came to their aid with massive sums of money and vigorous support for their restoration".

Λυκίων δὲ καὶ Καρῶν τὰς πόλεις Κῶν τε καὶ Ῥόδον ἀνέτρεψε μὲν βίαιος ἐς αὐτὰς κατασκήψας σεισμός· βασιλεὺς δὲ Ἀντωνίνος καὶ ταύταις ἀνέσῳσατο δαπανημάτων τε ὑπερβολῇ καὶ ἐς τὸν ἀνοικισμὸν προθυμία.

The *Historia Augusta* mentions Rhodes and vaguely refers to "cities in Asia".

There are also two inscriptions which refer to this earthquake. One comes from Stratonicea (CIG 2721), and commemorates the fact that Leo, an elder of the city, had gone to Rome when he was over seventy to seek the help of Antoninus Pius, who subsequently gave 250,000 *denarii*. The other inscription is dedicated to Antoninus Pius and the fatherland by some citizens of Stratonicea who had escaped unharmed from a series of violent earthquakes (CIG 2.1108). There is also a series of decrees (IGR 3.739) which record the aid offered by the famous benefactor Opramoas to the cities which had suffered in the earthquake. Amongst the cities mentioned as receiving aid are Myra and Pinara in Lycia.

It is likely, but not absolutely certain, that two inscriptions from Rhodes and Lindus also refer to this earthquake.

The first (IGR 4.1121.9-11) concerns Rhodes: "According to the prayer which they made to the gods after the earthquake".

Καθ' ἃν ἐνεδέλξαντο μετὰ τὸν/ σεισμὸν [εὐχὰν, / θεοῖς].

The second inscription (Lindos 2.449.13-6) concerns Lindus: "[Tiberius Claudius Antipater], together with his son Claudius Dioclida, rebuilt the sanctuary of Asclepius, which had been destroyed in an earthquake, at his own expense".

Κατεσκευάσαν/τα ἐκ τῶν ἰδίων τὸ ἱερὸν τοῦ Ἀσκληπιοῦ ἐν τᾷ πόλει / μετὰ τοῦ υἱοῦ αὐτοῦ Κλαυδίου Διοκλείδα κατερεῖ/φθεν ἐν τῷ σεισμῳ.

Ambraseys (1962, p.899) and Bowersock (1968) date this earthquake to the year 142. Hermann (1962) dates it to 144 AD, and Robert (1978, p.402) to 139 AD, identifying it as a cosmic earthquake (see also the recent work of Mitchell 1987). It is likely that other earthquakes in the same area, which have been dated to about the middle of the second century AD, actually occurred in this short period of years (see entry <117>).

<115> **a morning in October 160 Dura Europos**

inscriptions *AE* 1931, 114

literature Baur and Rostovtzeff (1931)

catalogues Guidoboni (1989).

There is an inscription recording an earthquake at the city of Dura Europos: "In the year 472 [of the Seleucid Era] in the month of Dios [October 160 AD], at about the fourth hour of the morning, an earthquake struck the area, and so the city built an altar to the great Zeus".

Ἐτους βου' μηνὸς δίου περὶ δ' ὥραν] ἡμερινὴν σειсмоῦ κατὰ τὴν χώραν γενομένου ἡ πόλις τὸν βωμὸν ἀνήγειρεν Μεγίστῳ Δίῳ.

The inscription was published by Baur and Rostovtzeff (1931, p.86), who think they can complete the date on the stone to read "the ninth day of the month of Dios", which would be 25/6 October. The "fourth hour" would be 10 a.m.

<116> **c.mid-2nd century (160/161?) ●Cyzicus, ●Ephesus, ●Mytilene, ●Nicomedia, ●Smyrna, ●Bithynia, ●the Hellespont**

sources Aristid. 49.38 ff. Keil; Letter of Marcus Aurelius (*PG* 115, 1211); Dio Cass. 70.4 = Zon. 12.1; [Aur. Vict.] *Epit. de Caes.* 16.13

inscriptions *IGR* 4.90

literature Behr (1968); Bowersock (1968); Robert (1968); Ward-Perkins (1984); Mitchell (1987)

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

In the third of his *Sacred Discourses*, Aelius Aristides writes: "when Albus was governor of Asia, there were many frequent earthquakes. Mytilene was almost razed to the ground, and in many other cities there were many shocks, and some villages were completely destroyed. The people of Ephesus and Smyrna ran out to one another in great agitation. The series of earthquakes and terrors was extraordinary".

οἱ πολλοὶ καὶ πυκνοὶ σεισμοὶ γίνονται ἐπὶ Ἀλβου ἄρχοντος τῆς Ἀσίας, καὶ τοῦτο μὲν δὴ Μυτιλήνη κατηνέχθη μικροῦ πᾶσα, τοῦτο δὲ ἐν πολλαῖς τῶν ἄλλων πόλεων πολλὰ ἐκινήθη, κῶμαι δὲ ἄρδην ἀπώλοντο, Ἐφέσιοι δὲ καὶ Σμυρναῖοι παρ' ἀλλήλους ἔθειον θορυβούμενοι, ἡ δὲ συνέχεια θαναμαστὴ καὶ τῶν σεισμῶν καὶ τῶν φόβων.

Further on (49.42), Aristides says that the earthquake caught up with him as he was sacrificing at the temple of Zeus Olympius on the hill of Atys: "And these things had just finished, when the earthquake came and so ravaged all the other land in between that not an inn was left standing, except for some small ruins".

καὶ ταῦτα τε ἀρτίως ἐπετέλεστο καὶ ὁ σεισμός ἐπελθὼν τῆς μὲν ἄλλης τῆς ἐν μέσῳ ἀπάσης χώρας οὕτως ἤψατο ὥστε μηδὲν τῶν καταγωγίων λιπεῖν, εἰ μὴ τί που μικρὸν ἐρείπιον.

The events described by Aristides (who was then at Smyrna: see 49.39) have been dated to 149 AD. (see Behr 1968). The governorship of Albus cannot be dated with absolute certainty, but various pieces of evidence suggest that it was about 160/1 (see Bowersock 1968 and Robert 1968, no.171).

An inscription from Mytilene (IGR 4.90) expresses the gratitude of the city to Antoninus Pius as "benefactor and founder of the city".

The earthquake seems to have destroyed Mytilene, but the damage at Smyrna appears to have been fairly limited — unlike that caused by the earthquake of 178 (see entry <117>). Although he did not write about it until about twenty years after the event, Aristides was in fact an eye witness of the earthquake: "it did not proceed up the Atys, nor to our Laneion estate at the south of the Atys, as far as could be seen, and ravaged nothing beyond".

ἄνω δὲ Ἄττος οὐ προὔβη οὐδὲ τοῦ πρὸς μεσημβρίαν Ἄττος ἡμετέρου χωρίου Λανείου, πλὴν ὅσον αἰσθεσθαι, πέρα δ' οὐχ ἤψατο οὐδενός.

This earthquake may be the same as that mentioned by Dio Cassius as having occurred at the time of Antoninus Pius [138-161 AD]: "It is also said that in the days of Antoninus a terrible earthquake occurred in the region of Bithynia and the Hellespont. Various cities were severely damaged or totally destroyed, Cyzicus in particular, and the temple there, which was the greatest and most beautiful of all temples, was destroyed. Its columns were four *orguiai* thick [c.7 m] and fifty cubits high [c.21.5 m], each consisting of a single block of stone, and in general the details of the building were more to be wondered at than praised".

Ἐπὶ τοῦ Ἀντωνίνου λέγεται καὶ φοβερώτατος περὶ τὰ μέρη τῆς Βιθυνίας καὶ τοῦ Ἑλλησπόντου σεισμός γενέσθαι, καὶ ἄλλας τε πόλεις καμεῖν ἰσχυρῶς καὶ πεσεῖν ὁλοσχερῶς, καὶ ἐξαιρέτως τὴν Κύζικον, καὶ τὸν ἐν αὐτῇ ναὸν μέγιστόν τε καὶ κάλλιστον ναῶν ἀπάντων καταρριφῆναι, ὃ τετράοργοι μὲν πᾶχος οἱ κίονες ἦσαν, ὕψος δὲ πεντήκοντα πηχέων, ἕκαστος πέτρας μιᾶς, καὶ τᾶλλα τὰ ἐν αὐτῷ ἕκαστον θανμάσαι πλέον ἢ ἐπαινέσαι.

Aurelius Victor records: "Ephesus in Asia, Nicomedia in Bithynia were destroyed by an earthquake".

Asiaeque Ephesus, ac Bithyniae Nicomedia constratae terrae motu.

Evidence of rebuilding appears in a letter of about 163/4 AD. from Marcus Aurelius to Euxenianus Publius (proconsul of Asia?). In it the emperor praises Euxenianus for his behaviour at Smyrna, where he distinguished himself "in alleviating the suffering that befell the people of Smyrna as a result of the earthquake there".

ἐπικουφίσας Σμυρναίοις τὴν ἐκ τοῦ κλόνου τῆς γῆς ἐπιγενομένην αὐτοῖς συμφοράν.

<117> **c.178 Poemanenum, ●●Smyrna** ▷surface faulting◁

sources 1 Philostr. *V. Soph.* 2.9.2; Dio Cass. 72.32.3 = Zon. 12.3; Eus. *Hieron. Chron.* 209c;

sources 2 *Orac. Sibyll.* 5.122ff., 386ff.; *Chron. Pasch.* 262; Georg. Sync. 667

inscriptions Hasluck (1906)

literature Cadoux (1939); Hüttl (1933-36); Bowersock (1968); Mitchell (1987)

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Hermann (1962); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

We know from a number of texts that Smyrna suffered an earthquake at the time of Marcus Aurelius; and he is also known to have granted tax concessions after the

earthquake. (For the previous interest shown by Marcus Aurelius in the seismicity of Smyrna, see his letter in entry <116>).

Dio Cassius writes: "[Marcus Aurelius] gave gifts of money to many cities, including Smyrna, which had suffered terrible destruction in an earthquake. And he assigned the task of rebuilding the city to a senator of praetorian rank".

Χρήματά τε πολλαῖς πόλεσιν ἔδωκεν, ἐν αἷς καὶ τῇ Σμύρνῃ δεινῶς ὑπὸ σειμοῦ φθαρείσῃ· καὶ αὐτὴν καὶ βουλευτῇ ἐστρατηγηκότῃ ἀνοικοδομῆσαι προσέταξεν.

Philostratus records that fissures (χάσματα) opened up in the ground at Smyrna; and he also describes Aristides' skill in persuading Marcus Aurelius to help the city.

A date for this earthquake is provided by later sources. Eusebius dates the earthquake to 179 AD: "The city of Smyrna in Asia was destroyed by an earthquake. In order to assist reconstruction, a ten-year exemption from taxes was granted".

Smyrna urbs Asiae terrae motu ruit. Ad cuius instaurationem decennalis tributorum immunitas data est.

The *Chronicon Paschale* records the earthquake as having occurred in 178 AD. Hermann (1962, col.1105) accepts this dating.

A possible addition to the above evidence is an inscription found at Poemanenum in Mysia which seems to refer to an earthquake there: a certain Claudianus had built an altar to Poseidon, thereby establishing a cult and becoming the first priest to erect an image of the god at his own expense. The inscription was published by Hasluck (1906). While it is not possible to date the earthquake accurately, it seems likely that if there was an earthquake, it occurred at the same time as the one at Smyrna, which is not far away.

<118> **dawn on 3 May 181? Moudoupolis, ● Nicomedia**

sources Mal. 289

literature Schenk von Stauffenberg (1931); Grosso (1964)

catalogues Hermann (1962); Guidoboni (1989)

There is evidence for this earthquake in a brief note in Malalas, who simply gives the day and month it occurred in an unspecified year in the reign of Commodus (180-192). Since the Greek text of Malalas has not survived in its entirety, it seems clear that some information which was probably in the original and may have given the exact date of the earthquake, is now missing; for his work seems to adhere to a chronicle style (hence the reference to the "third catastrophe"): "During the reign of Commodus, Nicomedia, the capital of Bithynia, suffered from the wrath of God. This was the city's third catastrophe, and it extended to Moudoupolis and the river Sangarius and surrounding areas, on 3 May / Artemisius at daybreak. The emperor gave generously to the city and restored it".

Ἐπὶ δὲ τῆς τοῦ αὐτοῦ Κομμοδου βασιλείας ἔπαθεν ὑπὸ θεομηνίας Νικομήδεια, μητρόπολις τῆς Βιθυνίας, τὸ τρίτον αὐτῆς πάθος ἕως τῆς Μουδουπόλεως καὶ τοῦ ποταμοῦ τοῦ Σαγάρεως τὰ περίξ μηνὶ μαίῳ τῷ καὶ ἀρτεμισίῳ γ' εἰς τὸ αὖγος. καὶ πολλὰ ἐχαρίσατο ὁ βασιλεὺς τῇ αὐτῇ πόλει, καὶ ἀνήγειρεν αὐτήν.

Since Malalas refers to an event which can be dated to 181 in the paragraph following the description of this earthquake, it may be that the Nicomedia earthquake occurred before that; but we cannot be sure.

<119> **191/192 Rome >escape of gas?<**

sources Herodian. 1.14.1-3

literature Ho Peng Yoke (1962); Mazzarino (1988)

catalogues Bonito (1691); Abbati (1703); Mercalli (1883); Baratta (1892, 1899, 1901); Galli (1906); Carrozzo *et al.* (1973); Guidoboni (1989)

Herodianus records a series of prodigies which occurred at the end of the reign of Commodus. They include certain astronomical phenomena and an earth tremor: "There were certain portents which coincided with these events; some stars shone continuously by day, others became elongated and seemed to hang in the middle of the sky. [...] Without any warning of a rainstorm or clouds gathering, there was a small preliminary earth tremor; then either a flash of lightning occurred in the night, or a fire broke out somewhere as a result of the earthquake. Whatever the cause, the entire Temple of Peace, the largest and most beautiful of all the buildings in the city, was burned to the ground".

ἐγένοντο δέ τινες κατ' ἐκεῖνο καιροῦ καὶ διοσημεῖαι. ἀστέρες γὰρ ἡμέριοι συνεχῶς ἐβλέποντο, ἕτεροι τε ἐς μῆκος κεχασμένοι ὥς ἐν μέσῳ ἀέρι κρέμασθαι δοκεῖν. [...] οὔτε γὰρ ὄμβρου προὔπαρξαντος οὔτε νεφῶν ἀθροισθέντων, σεισμοῦ δὲ ὀλίγου προγενομένου γῆς, εἴτε σκηπτοῦ νύκτωρ κατενεχθέντος, εἴτε καὶ πυρός ποθεν ἐκ τοῦ σεισμοῦ διαρρύντος, πᾶν τὸ τῆς Εἰρήνης τέμενος κατεφλέχθη, μέγιστον καὶ κάλλιστον γενομένων τῶν ἐν τῇ πόλει ἔργων.

The fire damage to the temple was repaired by Septimius Severus. In another passage (1.1.4), Herodianus records, in very general terms, that in the period from Augustus to Marcus Aurelius, there had been countless disasters, changes of climate and earthquakes, such as had not been seen in the two previous centuries (see Mazzarino 1988).

The astronomical phenomena mentioned by Herodianus may include a comet which was observed by Chinese astronomers in October-November 191 A.D. (Ho Peng Yoke 1962, pp.153-4).

<120> **c.3rd century ●Hierapolis, ●Laodicea, Phrygia**

sources *Orac. Sibyll.* 12.279-81

literature Ritti (1985)

catalogues Guidoboni (1989)

Since the only evidence for this earthquake is to be found in a text which is difficult to interpret, it remains subject to doubt. Book XII of the *Sibylline Oracles*, which can be dated to the 3rd century A.D., records an earthquake as follows, adopting the usual formula for an *a posteriori* prophecy: "Phrygia, too, with its rich flocks, shall lament as a result of earthquakes. Alas! Laodicea, and alas! wretched Hierapolis, you were the first to be swallowed up by the yawning earth".

Καὶ Φρυγίη σεισμοῖσι πολυμήλη στοναχήσει. / αἰαῖ Λαοδίκεια, αἰαῖ Ἱεράπολι τλήμων· / ὕμᾱς γὰρ πρῶτας ποτ' ἐδέξατο γαῖα χανοῦσα.

As Ritti points out (1985, p.26), this text is to be taken as evidence of an earthquake in the 3rd century A.D.

<121> **217 Rome?**

sources Dio Cass. 79.25.1

catalogues Schmidt (1881); Mercalli (1883); Guidoboni (1989)

Amongst a number of prodigies which foretold the death of the emperor Macrinus (who was killed in June 218), Dio Cassius mentions an earthquake which occurred the year before: "a great earthquake occurred".

Καὶ σεισμὸς ἰσχυρὸς ἐγένετο.

Since the city of Rome is mentioned in this context, and since certain buildings in Rome are mentioned in relation to the other prodigies, it seems likely that the earthquake took place in Rome as well.

< 122 > **9 and 17 September and 19 October 223 Rome**

sources SHA Al. Sev. 44.8; *Chron. Pasch.* 5.214

catalogues Bonito (1691); Abbati (1703); von Hoff (1840); Mallet (1853); Mercalli (1883); Baratta (1892, 1901); Galli (1906); Carrozzo *et al.* (1973); Guidoboni (1989)

Our information about this earthquake comes from a late (6th century) but nonetheless reliable text. According to the *Chronicon Paschale*, an earthquake struck Rome on three separate days in the year 223: "On the third day of the fourteenth indiction, during the consulship of Maximus and Aelianus, vigils were kept in Rome for three days, during which there were violent earthquakes: on 9 September, 17 September and 19 October".

Ἰνδ. ιδ'. γ'. ὑπ. Μαξίμου καὶ Αἰλιανοῦ. Δαινυκτέρευσις ἡμερῶν τριῶν ἐν Ῥώμῃ γέγονεν, καὶ σεισμοὶ σφοδροὶ ἐν αὐτῇ ἐγένοντο πρὸ ε' ἰδῶν σεπτεμβρίων καὶ πρὸ ιε' καλανδῶν ὀκτωβρίων καὶ πρὸ ιδ' καλανδῶν νοεμβρίων.

According to the *Historia Augusta*, the emperor Alexander Severus (222-235 AD.) took steps to rebuild those (unidentified) towns which had been struck by the earthquake: "He contributed money from taxes towards the cost of restoring public and private buildings in many towns which were left disfigured by the earthquake".

Multis civitatibus, quae post terrae motus deformes erant, sumptus ad instaurationem operum et publicorum et privatorum [pecuniam] ex vectigalibus dedit.

< 123 > **235-236 • Amasia, • Cappadocia, • Pontus**

▷ surface faultings ◁

sources Cypr. ep. 75.10.1

inscriptions Cumont (1910)

literature Robert (1978)

catalogues Bonito (1691); Hermann (1962); Guidoboni (1989)

There is an epitaph (Cumont 1910, III. 1, no.139), dating to 235-236 AD., which records the death of a seven year old boy in this earthquake at Amasia in Pontus: "In the year 238 [of the era of Amasia = 235-236 AD.] Agricola [dedicated] to his beloved son Dio. When he was seven years old, an earthquake and Moira deprived him of the sweet light of day".

Ἔτους σλ'η' Ἀγρικόλας [Δίῳ]νι τῷ γλυκυτάτῳ υἱῷ. Ἑπτάετην δὲ σεισμὸς καὶ Μοῖρα γλυκεροῦ φάους ἐστέρησεν.

The inscription is in Robert (1978, p.398); see also Hermann (1962, col.1105).

This piece of evidence clearly tallies with what we find in Cyprian's *Epistole*, where an

earthquake is mentioned as having occurred in Cappadocia and Pontus about 237 AD.: "About twenty-two years after the time of the emperor Alexander, the whole world, and the Christians in particular, were subjected to a host of troubles and afflictions. There were many earthquakes at frequent intervals, with the result that many buildings in both Cappadocia and Pontus were destroyed, and indeed whole towns were swallowed up by gaping chasms in the ground".

Ante viginti enim et duos fere annos temporibus post Alexandrum imperatorem multae conflictationes et pressurae acciderunt vel in commune omnibus hominibus vel privatim Christianis: terrae etiam motus plurimi et frequentes extiterunt, ut et per Cappadociam et per Pontum multa subruerent, quaedam etiam civitates in profundum receptae dirupti soli hiatu devorarentur.

(124) 241 ● Aphrodisias?

sources SHA Gord. 26.1

inscriptions AE 1984, 875

literature Reynolds (1982)

catalogues Ligorio [1574-7]; Bonito (1691); Hermann (1962); Shebalin *et al.* (1974); Guidoboni (1989)

The life of the emperor Gordian III (238-244) in the *Historia Augusta* records a disaster of immense proportions: "There was a severe earthquake in Gordian's reign — so severe that whole cities with all their inhabitants were swallowed up by the earth. Vast sacrifices were offered throughout the entire city and the whole world because of this. And Cordus says that the Sibylline Books were consulted, and everything that seemed to be required by them was done; whereupon this worldwide scourge was assuaged. The earthquake was assuaged during the consulship of Praetextatus and Atticus".

Fuit terrae motus eo usque gravis imperante Gordiano, ut civitates etiam terrae hiatus cum populis deperirent. Ob quae sacrificia per totam urbem totumque orbem terrarum ingentia celebrata sunt. Et Cordus quidem dicit inspectis libris Sibyllinis celebrati-sque omnibus, quae illic iussa videbantur, mundanum malum esse sedatum. Sedato terrae motu Praetextato et Attico consulibus.

The text does not give an exact location for the earthquake. It has been suggested that one of the cities struck by the earthquake was Aphrodisias, on the basis of remarks made by Reynolds (1982). He refers to some inscriptions which tell of the collapse and restoration of buildings in Aphrodisias.

There is another reference to the earthquake in Gordian III's letter of reply, in 243 AD., to a protest from the people of Aphrodisias about decisions made by the *Koinon* of the province, which required them to come to the aid of earthquake victims (AE 1984, 875). The emperor pointed out that the aid which had been requested of them could only be voluntary (Reynolds 1982).

The fact that the source refers to a "worldwide scourge" suggests an occurrence of vast proportions. The phrase *mundanum malum* is not so different from the *per totum orbem facto*, which Jerome used to describe a mid-4th century earthquake, and seems to be characteristic of the late antique mental attitude to particularly disastrous natural phenomena. Once again an earthquake is taken to foretell war; and indeed, as soon as it died down, Gordian III set off with a large army to attack the Persians.

Hermann (1962, col.1105) arbitrarily assumed that the earthquake occurred at Rome, but he only took into consideration the evidence provided by the *Historia Augusta*.

proved not to have taken place < 125 > **second half of the 3rd century Palmyra**
sources Yebamoth (17a)
literature Obermeyer (1929); Winnett and Reed (1970); Oppenheimer (1983)

In the tractate of the Babylonian Talmud called Yebamoth (17a), we read: "R. Joseph sat behind R. Kahana while R. Kahana sat before Rab Judah, and while sitting he made the following statement: 'Israel will make a festival when Tarmod will have been destroyed'. But, surely, it was destroyed! — That was Tammod. R. Ashi said: Tarmod and Tammod are identical, but the city was rebuilt; when it was destroyed on one side it was settled on the other side, and when the other side was destroyed it was settled on the first side".

יְתִיב רַב יוֹסֵף אַחֲרָיָה דְרַב כְּהֵנָּה וְיִתְיִב רַב כְּהֵנָּה קָמִיה דְרַב יְהוּדָה וְיִתְיִב וְקָאָמַר
עֲתִידִין יִשְׂרָאֵל דְּעֲבָדֵי יוֹמָא טַבָּא כִּי חֲרִבֵי תַרְמוּד. וְהָא חֲרִיב הָרִיב תַּמְמוּד הוּאֵי רַב אֲשִׁי
אָמַר הֵינָּה תַרְמוּד הֵינָּה תַּמְמוּד.

According to the German scholar Obermeyer (1929, pp.198-9), the city of Tammod referred to by the Talmudic teachers is to be related to the Arab tribe Thamud, mentioned in the Koran (7.76): "So the earthquake seized them, and morning found them in their habitation fallen prostrate". This hypothesis, which is accepted in the commentary to the English translation of the Talmud edited by I. Epstein (London and New York, 1935-52) suggests that the text of Yebamoth 17a is referring to the same event as that mentioned in the Koran, and therefore confirms that Tammod was destroyed in an earthquake. It has to be pointed out in this connection, however, that this is the only instance of the place name Tammod occurring in the Talmud, and that it is probably a corruption of Tarmod, which is itself a variant of the normal form Tadmor, the Semitic name for Palmyra in Syria (see also: Oppenheimer 1983, p.443). This possibility is also supported by the similar way in which Tammod and Tarmod are written (the former having written consonants TMWD and the latter TRMD), as well by Rabbi Ashi's specific statement that the two names refer to one place. We can therefore reject Obermeyer's hypothesis and conclude that the Koran (7.76) and Yebamoth (17a) in the Talmud are referring to two different events. It seems very likely that the Koran is recording an earthquake which did indeed occur in northern Arabia at an unknown date but certainly before the early 7th century AD. (it is to be related to the preaching of the pre-Islamic prophet Salih: see Winnett and Reed 1970, where the earthquake seems to be placed in the region around Tayma). The passage in the Babylonian Talmud, on the other hand, refers to a double destruction of Palmyra (first one part and then the other), and does not provide either a date or a cause; so the cause was not necessarily an earthquake. It is very likely, in fact, that these are events connected with the siege and capture of the city by Aurelianus in 273 AD.

< 126 > **262 ○ Asia Minor ▷ seismic sea-wave? <**

sources SHA Gall. 5.2-6
literature Foss (1979); Karwiese (1985)
catalogues Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Ambraseys (1962 b); Hermann (1962); Caputo and Faita (1984); Maamoun *et al.* (1984); Guidoboni (1989)

The *Historia Augusta* records that during the consulship of Gallienus and Faustianus, there were a number of serious disasters in various parts of the Mediterranean, namely at Rome, and in Libya and Asia Minor. The narrator seems to draw together the disasters of that year into a single picture, perhaps for dramatic effect; but they were probably separate occurrences in separate places. Earthquakes, sea-waves, chasms in the ground, and plagues are mentioned: "During the consulship

of Gallienus and Faustianus, amid so many calamities of war, there was also a terrible earthquake and darkness for many days. The sound of thunder was also heard, but it was more as though the earth was roaring than like Jupiter thundering. And many buildings were swallowed up with their inhabitants, and many people died of fright. The disaster was worst in the cities of Asia; but Rome, too, was shaken, and Libya as well. In many places the earth gaped open and salt water appeared in the fissures. Many cities were also engulfed by the sea. Consequently, the favour of the gods was sought by consulting the Sibylline Books and, as they commanded, sacrifices were made to Jupiter Salutaris. For so great a plague, too, had struck both in Rome and the cities of Achaia, that five thousand people died of the same disease in a single day. While Fortune thus raged, the Roman world was devastated by earthquakes in one place, clefts in the ground in another, and plague in many places".

Gallieno et Fausti[ni]ano consulibus inter tot bellicas clades etiam terrae motus gravissimus fuit et tenebrae per multos [dies] auditum praeterea tonitruum terra mugiente, non Iove tonante, quo motu ipsae multae fabricae devoratae sunt cum habitatoribus, multi terrore emortui; quod quidem malum tristius in Asiae urbibus fuit. Mota est et Roma, mota Libia. Hiatus terrae plurimis in locis fuerunt, cum aqua salsa in fossis appareret. Maria etiam multas urbes occuparunt, pax igitur deum quaesita inspectis Sibyllae libris factumque Iovi Salutari, ut praeceptum fuerat, sacrificium. Nam et pestilentia tanta extiterat vel Romae vel in Achaicis urbibus, ut uno die quinque milia hominum pari morbo perirent. Saeviente fortuna, cum hinc terrae motus, hinc hiatus soli, ex diversis partibus pestilentia orbem Romanum vastaret.

The wording of the passage does not allow us to establish the area covered by these events with any certainty. As for Asia Minor, it is not possible to deduce from the text exactly where the events described took place.

Since the earthquake occurred during the reign of Gallienus, and since we know for certain that Gallienus had Faustianus as his colleague in the year 262, that is our first piece of solid information towards dating the earthquake. And amongst the *bellicae clades* (military defeats) which the source mentions and which beset the empire in 262, there was an invasion by the Goths.

With the possible exception of the period between the death of Commodus and that of Claudius II (192-270 A.D.), when the first Severi were on the imperial throne, one finds frequent reports of earthquakes, especially in the eastern Roman empire. The regularity of their occurrence makes them somewhat suspect, however, particularly since earthquakes are only one element in this dramatic picture of multiple disasters (sea-waves, famine, epidemics etc.).

This is particularly evident in the earthquake passage in the life of Gallienus: those which struck Asia and Libya were followed by other disasters (sea-waves, cities swallowed up by the earth and epidemics). Sacrifices were made to Jupiter Salutaris as prescribed by the *Sibylline Books*. During the reign of Gallienus, the general decadence of the age was felt more keenly than usual, and destructive natural phenomena were interpreted almost as though they reflected the actions of Rome's enemies. A few years earlier, Persia had moved on to the offensive under the leadership of Shapur the Great, and it was precisely the cities of Rome's eastern provinces which had suffered a great deal from the war.

Karwiese (1985) has analysed the parallel passages in the historians (Zosimus, Jordanes and Syncellus) which record other disasters occurring in the same period — in particular a total eclipse of the sun, which we can date to 4 June 262. He also claims to have found archaeological evidence of the earthquake at Ephesus, Aenus and Pergamum.

For a critique of the arbitrary assumption that evidence of rebuilding is evidence of ancient earthquakes, see Foss (1979, pp.188-91).

< 127 > **262 Rome**

sources 1 SHA Gall. 5.2

sources 2 Ioh. De Deo Chron. 307

catalogues Ligorio [1574-7]; Filippo da Secinara (1652); Bonito (1691); von Hoff (1840); Mallet (1853); Capocci (1861); Mercalli (1883); Galli (1906); Carrozzo *et al.* (1973); Caputo and Faita (1984); Guidoboni (1989)

According to the *Life of Gallienus* in the *Historia Augusta*, a number of great disasters occurred in various parts of the Mediterranean, including Rome, Libya and Asia Minor (see entry < 126 >) during the consulship of Gallienus and Faustianus [262 AD.]. The only remark specifically concerning Rome is: "Rome, too, was shaken".

Mota est et Roma.

< 128 > **262 ○Libya ▷seismic sea-wave? <**

sources SHA Gall. 5.2-6

literature Foss (1979); Karwiese (1985)

catalogues Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Sieberg (1932 a);

Hermann (1962); Caputo and Faita (1984); Maamoun *et al.* (1984); Guidoboni (1989)

According to the *Life of Gallienus* in the *Historia Augusta*, a number of great disasters occurred in various parts of the Mediterranean, including Rome, Libya and Asia Minor (see entry < 126 >) during the consulship of Gallienus and Faustianus [262 AD.]. The only remark specifically concerning Libya is: "but Rome, too, was shaken, and Libya as well. In many places the earth gaped open and salt water appeared in the fissures. Many cities were also engulfed by the sea".

Mota est et Roma, mota Libia. Hiatus terrae plurimis in locis fuerunt, cum aqua salsa in fossis appareret. Maria etiam multas urbes occuparunt.

The wording of the passage does not allow us to establish the area covered by these events with any certainty. In the 3rd century AD, the term "Libya" was usually used to indicate the area between Cyrenaica and Egypt, but many Greek writers continued to call the whole of Africa *Libye* until late times.

< 129 > **a night in the year 267 ●Ad Maiores**

inscriptions CIL 8.2480, 2481

literature Lepelley (1984 a); *Catalogo epigrafi* (1989)

catalogues Hermann (1962); Guidoboni (1989)

Two inscriptions with similar texts from Ad Maiores (Besseriani, a few km south of Négrine, Algeria) record the rebuilding in 286 or 287 AD. of a monumental arch which had been destroyed in 267 AD. by an earthquake which occurred during the night, when people in the city were asleep.

Here is the text of CIL 8.2480: "For the safety of our two lords [---], Flavius Paulinianus and [Clodius Victor], sons (of Flavius Flavianus), built, in this [place of our municipality, [the arch], for the sum of [--- thousand sesterces, which] Pomponius Macia[nus and Clodius Victor had promised after the earthquake] which, during the consulship of Pat[ernus and] Arciselaus, [struck the fatherla]nd at [that hour of the] ni[ght when the citizens were asleep. The ded[i]cation was arranged by Flav[ius Flavianus], a man of exalted rank, [our governor (or patronus?)]. The work was supervised by [C]occei[us Donatianus, a Roman knight, who is in charge of the administration of the city]".

Pro salute D(ominorum) N(ostorum duorum) [---, arc]u[m ex HS --- m(illibus)] n(umum) hoc [loco muni]cipio n(ostro), [quem] / Pomponius Macia[nus Clodius Victor promiserant post terrae motum], quod [patria]e, Pat[erno et]/ Arcesilao co(n)s(ulibus), hora noc[tis (illa), somno fessis, contigit dedica]n[te] v(iro) p(erfectissimo) Flav[i]o Flaviano p(raeside vel patrono) n(ostro)] / Flavius Paulinianus f(ilius), [Clodius Victor f(ilius)] fecerunt curante [C]occei[o Dona]/[tiano e(quite) R(omano) c(uratore) reip(ublicae)].

Here is the text of *CIL* 8.2481: "For the safety of our two lords [---], Clodius Victor [and Flavius Paulinianus, sons (of Flavius Flavianus), built], in th[is] [place of our municipium, the arc]h, for the sum of [--- thousand sesterces], which [for the honour of the duumvi]rate, Clodius Victor and [Pomponius Macianus] had promise[d after the eart]hquake which, [during the consulship of] Paternus a[nd Arciselaus], struck the fatherland [at that hour of the night when the citizens were a]sleep. The dedi[c]ation was arranged by Flavius Fla[vi]anus, a man of exalted rank, our governor (or patronus?). [The work was supervised by Co]cceius Donatianus, a Roman [knight], who is in charge of the administration of the city".

Pro salute D(ominorum) N(ostorum duorum) [---, ar]c[um ex HS --- m(illibus)] n(umum) h[oc] [loco municipio n(ostro)], / quem Clodius Victor [Pomponius Macianus ob honorem Ilvi]ratus promiser[ant post terrae motum], quod patriae, Paterno e[st] Arcesilao co(n)s(ulibus), hora noctis (illa), somno f[ess]is, contigit, dedi[c]ante v(iro) p(erfectissimo) Flavio Fla[vi]/ano p(raeside vel patrono) n(ostro) Clodius Victor f(ilius) [Flavius Paulinianus f(ilius), fecerunt curante Co]cceio Donatiano [e(quite)] R(omano) c(uratore) reip(ublicae).

For a discussion of the inscriptions, see also Lepelley (1984 a, p.487 and note 85). This earthquake also appears to have caused damage at Lambaese (see the commentary in *CIL* 8.2571).

< 130 > 268-270 • Nicomedia

sources Mal. 298-9
literature Ruge (1936)
catalogues Hermann (1962); Papazachos and Papazachos (1989); Guidoboni (1989)

The only record of this earthquake is in Malalas: "During his reign [that of Claudius, 268-270 AD.], Nicomedia, a city in Bithynia, suffered the wrath of God for the fourth time, as far as the rivers and Dacibyza. The emperor gave money for the survivors and the city".

Ἐπὶ δὲ τῆς βασιλείας αὐτοῦ ἔπαθε Νικομήδεια, μητρόπολις τῆς Βιθυνίας, τὸ τέταρτον αὐτῆς πάθος ἀπὸ θεομηνίας ἕως ποταμῶν καὶ Δακιβίζης. καὶ ἐφιλοτιμήσατο τοῖς ζήσασιν πολλὰ καὶ τῇ πόλει.

< 131 > 275-276 Rome?

sources SHA Tac. 17.4-5
catalogues Guidoboni (1989)

A reference in the *Historia Augusta* to an earthquake during the brief reign of the emperor Tacitus (275-276 AD.) is to be treated with great caution, partly because it is in a list of prodigies, but especially because the source mentions the event purely as the

probable cause of some statues falling down in the chapel of the Lares: "These were the omens of his death: the doors of his father's tomb suddenly burst open. The shade of his mother, as though alive, appeared by day to both Tacitus and Florianus, for they were supposed to be the sons of different fathers. All the gods in the *lararium* fell down, either because of an earthquake or for some other reason. The statue of Apollo, which they both worshipped, was found removed from the top of its pedestal and laid on a couch, without the agency of human hand".

Mortis omina haec fuerunt: patris sepulchrum disruptis ianuis se aperuit. Matris umbra se per diem et Tacito et Floriano velut viventis obtulit, nam diversis patribus nati ferebantur. In larario di omnes seu terrae motu seu casu aliquo conciderunt. imago Apollinis, quae ab his colebatur, ex summo fastigio in lectulo posita sine hominis cuiuspiam manu deprehensa est.

Rome was the only place where the earthquake was felt — if it occurred at all.

< 132 > **293-306 • Salamis (Cyprus) ▷ seismic sea-wave <**

sources Mal. 313
literature Oberhummer (1903); Soren and Lane (1981)
catalogues Guidoboni (1989)

Malalas dates this earthquake to the reign of Constantius Chlorus [293-306]: "In his reign the city of Salamis in Cyprus suffered from the wrath of God, and the greater part of it was plunged into the sea by an earthquake. The remainder was levelled to the ground. Constantius restored it. He gave many extremely generous gifts, undertook rebuilding, and exempted the surviving citizens from taxes for four years. As he promised a variety of buildings for what was previously known as Salamis, it had its name changed from that time to Constantia".

Ἐν δὲ τῇ αὐτοῦ βασιλείᾳ ἔπαθεν ὑπὸ θεομηνίας Σαλαμιάς πόλις τῆς Κύπρου, ὑπὸ σεισμοῦ καταποντισθεῖσα εἰς τὴν θάλασσαν τὸ πολὺ αὐτῆς μέρος· τὸ δὲ λοιπὸν ἕως ἐδάφους ἔπεσεν. ἦντινα ἀνεγείρας ὁ αὐτὸς Κωνσταντίος καὶ πολλὰ πάνυ φιλοτιμησάμενος καὶ κτίσας καὶ τοῖς ζήσασι πολίταις συγχωρήσας συντελείας ἐπὶ ἔτη τέσσαρα, καὶ κτίσας διαφόροις κτίσμασι τὴν πρώην μὲν λεγομένην Σαλαμιάδα, ἐξ ἐκείνου δὲ μετακληθεῖσαν Κωνσταντίαν.

Because of the context in which Malalas made this comment, we concluded, in Guidoboni (1989, p.674), that the earthquake occurred in the time of Constans II [337-361], and in doing so we were taking up the argument of Soren and Lane (1981), whose source was a remark by Oberhummer (1903, p.440ff.). The confusion was caused by a comparison with Theophanes, who records two similar earthquakes for 332 and 342 (see entries < 136 > and < 140 >).

< 133 > **4th century • Corycus**

inscriptions Gottwald (1939)
literature Robert (1939)
catalogues Guidoboni (1989)

Gottwald (1939) published an epitaph from Corycus in which father and son, both called Asclepiades and both killed in an earthquake, express the hope that any ill-intentioned persons who desecrate their tomb will suffer a similar fate: "As a result of earthquakes, Apollonides in memory of his father Asclepiades and his brother Asclepiades [---]".

σεισμοῖς. Ἀπολλωνί(δ)ης Ἀσκληπιάδῃ τῷ πατρὶ καὶ Ἀσκληπιάδῃ τῷ ἀδελφῷ μνείας χάριν [---].

Any desecrators of tombs are threatened with a singular variant on the usual formula for curses: "may they suffer the same agony (which they suffered) in earthquakes".

τὰ αὐτὰ πάθοιτον ἃ ἐκῆ(ν)ι ἐν τοῖς σεισμοῖς.

For the interpretation of this last sentence, see Robert (1939).

⟨ 134 ⟩ 303/304 ●Sidon, ●Tyre, Syria

sources Eus. *Mart. Pal.* 4.15; Eus. *Hieron. Chron.* 228a; Oros. *Hist.* 7.25.14

literature Russell (1985)

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Sieberg (1932 a); Amiran (1950-51); Hermann (1962); Ben-Menahem (1979); Guidoboni (1989)

In his *Chronicon*, Eusebius records an earthquake in 304 AD: "A terrible earthquake caused many buildings to collapse at Tyre and Sidon, and a large number of people were killed".

Terrae motu horribili apud Tyrum et Sidonem multa opera conciderunt, et populus innumerabilis oppressus.

In another work of his (*The Martyrs of Palestine*), Eusebius mentions the same earthquake, connecting it to the martyrdom of Affianus, which probably occurred on 2 April 303. Orosius dates the earthquake to 303 AD: "An earthquake followed in Syria, as a result of which buildings collapsed everywhere, and many thousands of people were crushed in Tyre and Sidon".

Sequitur terrae motus in Syria, ex quo apud Tyrum et Sidonem passim labentibus tectis multa hominum milia prostrata sunt.

Hermann (1962) quotes Orosius and is inclined to date the earthquake to 303 AD. See Russell (1985, p.42) for the archaeological literature on excavations at various places in Palestine in which collapses are identified and attributed to this earthquake.

⟨ 135 ⟩ 320 ●Alexandria

sources Theoph. 17

catalogues Bonito (1691); Schmidt (1881); Sieberg (1932 a); Grumel (1958); Hermann (1962); Ben-Menahem (1979); Maamoun *et al.* (1984); Guidoboni (1989)

Theophanes records a destructive earthquake at Alexandria: "There was a terrible earthquake at Alexandria, such that many buildings collapsed and a large part of the population was killed".

Ἐγένετο δὲ καὶ σεισμὸς ἐν Ἀλεξανδρείᾳ λαβρότατος, ὥστε πεσεῖν οἰκίας πολλὰς καὶ λαὸν πολὺν ὀλέσσαι.

Theophanes dates the earthquake to the year of the world 5812 [320 AD].

⟨ 136 ⟩ 332 ●Salamis (Cyprus)

sources 1 Theoph. 29

sources 2 Cedren. 519

catalogues Bonito (1691); Schmidt (1881); Grumel (1958); Ben-Menahem (1979)

Grumel (1958) and Hermann (1962) date the earthquake to 341 AD. Grumel suggests a connection between Eusebius' vague reference to an earthquake "in the East" and the earthquake at Antioch in 341 AD recorded by Theophanes.

< 139 > 341 • Maximianopolis

sources 1 Eus. *Hieron. Chron.* 235 c; *Consul. Const.* a. 341; Mal. 323; Jac. Edess. 292
sources 2 Oros. *Hist.* 7.29.5
catalogues Guidoboni (1989)

Malalas records: "During the reign of Constantine, Maximianopolis in Osroene suffered the wrath of God: its second calamity after its capture by the Persians. The emperor Constantine reconstructed the city and its walls, for they had fallen down. He gave generously to the survivors. He renamed the city Constantina after himself".

Ἐπαθε δὲ ἐπὶ τῆς βασιλείας τοῦ αὐτοῦ Κωνσταντίνου ὑπὸ θεομηνίας Μαξιμιανούπολις τῆς Ὀσδρονῆς τὸ δεύτερον αὐτῆς πάθος τὸ μετὰ τὸ ληφθῆναι ὑπὸ τῶν Περσῶν. καὶ ἀνήγειρεν αὐτὴν ὁ αὐτὸς βασιλεὺς Κωνσταντῖνος καὶ τὰ τεῖχη αὐτῆς καὶ τοῖς περισωθεῖσι πολλὰ ἐχαρίσατο· καὶ μετεκάλεσεν αὐτὴν εἰς τὸ ἴδιον ὄνομα Κωνσταντῖναν.

This earthquake is probably the one referred to in Jerome and the *Consularia Constantinopolitana*. Jerome writes: "Many eastern cities were reduced to ruins by a terrible earthquake".

Multae Orientis urbes terrae motu horribili consederunt.

Orosius reports the same thing. In the *Consularia Constantinopolitana* (its information, however, seems to come largely from Antioch sources) the earthquake is reported as occurring in 341: "in that same year there was an earthquake in the East for the whole year, but not at Antioch".

Eo ipso anno terraemotus fuit ad Orientem per totum annum praeter Antiochiam.

Hence the date would appear to be 341, and indeed James of Edessa places the earthquake after the victory of Constans over the Franks [341/2]. However, this does not allow us to assume that this is the earthquake also referred to by Malalas, for his passage comes after the death of Constantine the Great [307-337]. This would lead us to think that he meant Constantine II [337-340]; but it is probable that Malalas himself — or, more likely, the scribes who copied the manuscript of his chronicle — confused Constans and the more famous Constantine. Hence it may be Constans rather than Constantine II who is referred to.

< 140 > 342 • Salamis, Cyprus

sources 1 Theoph. 37
sources 2 Ioh. Eph. *apud* Mich. Syr. 1.170; [Dion. Tellmahr.] 2.169; Marian. Scot. 3.355
literature Oberhummer (1903); Soren (1981); Soren and Lane (1981)
catalogues Bonito (1691); Grumel (1958); Hermann (1962); Guidoboni (1989)

Theophanes (who brings together the two earthquakes of 332 AD and 342 AD in a single entry) describes an earthquake in Cyprus and at Salamis in the year of the world 5834 [342 AD]: "A violent earthquake struck Cyprus, and much of the city of Salamis was destroyed".

The only evidence for this earthquake is to be found in the Chronography of Theophanes (8th century). In spite of its late date, it is a source which deserves consideration. Theophanes writes: "In that same year [year of the world 5824, i.e. 332] there was a strong earthquake in Cyprus. Salamis was destroyed and lost a large proportion of its inhabitants".

Τῷ δ' αὐτῷ ἔτει, σεισμοῦ λαβροτάτου γενομένου ἐν Κύπρῳ, Σαλαμίνα πόλις κατέπεσε καὶ ἱκανὴν πληθὺν διέφθειρεν.

(137) 334-335 •the island of Cos

sources 1 Elia Nisib. *Syr. versio* 99

sources 2 [Dion. Tellmahr.] 169

Elias of Nisibis writes: "The year 646 [of the Greeks; i.e. 334-335 AD.]. The chronological canon of Andronicus and the Ecclesiastical History of Socrates. There was an earthquake on the island of Cos and many places collapsed".

Ἐν τῷ αὐτῷ ἔτει, σεισμοῦ λαβροτάτου γενομένου ἐν τῇ Κόσῳ, πολλὰ καὶ μεγάλα κτίρια κατέπεσαν.

This earthquake is unknown to the seismological tradition.

(138) 341 •Antioch

sources 1 Socr. 2.10; Theoph. 36

sources 2 *Chron. Maron.* 130; *Chron.* 724 104; [Dion. Tellmahr.] 169; Cedren. 522; Niceph. Call. 146.6; Mich. Syr. 1.170

literature Downey (1961); Henry (1985)

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a); Amiran (1950-51); Grumel (1958); Hermann (1962); Ben-Menahem (1979); Guidoboni (1989)

The historian Socrates records a series of earthquakes in the eastern Mediterranean, and in particular at Antioch, entering them under the year 341 AD: "At the same time it also happened that public affairs were disturbed [...] as well as by most violent earthquakes in the East, but especially at Antioch, which continued to suffer shocks for a whole year".

Ἐν ταύτῳ δὲ, καὶ σεισμοὶ μέγιστοι ἐν τῇ Ἑώᾳ ἐγένοντο· μάλιστα δὲ ἡ Ἀντιόχεια ἐπὶ ἑνιαυτὸν ὅλον ἐσειέτο.

Michael the Syrian, whose source is Socrates, attributes to the earthquake the reported collapse of the Arian church at Antioch (Socr. *HE* 2.8).

Theophanes gives the date as the year of the world 5833 [341 AD.]: "In that year Antioch was shaken by violent earthquakes, and was in danger for three days".

Τῷ δ' αὐτῷ ἔτει Ἀντιόχεια ὑπὸ σεισμῶν μεγάλων ἐπὶ τρισὶν ἡμέραις ἐκινδύνευσεν.

According to the *Maronite Chronicle* (second half of the 7th century) — which does not date the earthquake, but places it after the death of Constantine [337] — the shocks lasted for thirteen days; but this may be a scribal error.

The *Miscellaneous Chronicle of 724* records the earthquake without giving a date, but places it after the Neocaesarea earthquake of 343 (see entry (141)).

Cedrenus says that the earthquake at Antioch lasted for three days in the fourth and fifth years of the reign of Constantius II. Since he reigned from 337 to 361 AD, the year in question must be 341/342.

Constantius II], because of a great earthquake, Neocaesarea was engulfed by the sea, and only the bishop's palace and the church survived".

Τῷ ζ' ἔτει σεισμοῦ μεγάλου γενομένου Νεοκαισάρεια ποντισθεῖσα κατεπτόθη πλὴν τῆς ἐπισκοπῆς καὶ τῆς ἐκκλησίας.

⟨ 142 ⟩ **344 •the island of Rhodes**

sources 1 Theoph. 37

sources 2 Cedren. 522

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a); Grumel (1958); Galanopoulos (1961); Shebalin *et al.* (1974); Ben-Menahem (1979); Papazachos and Papazachos (1989); Guidoboni (1989)

Theophanes records that an earthquake destroyed the island of Rhodes in the year of the world 5836 [344 AD]: "A violent earthquake occurred in that year, and the island of Rhodes was destroyed".

Τούτῳ τῷ ἔτει σεισμοῦ γενομένου μεγάλου, Ρόδος ἡ νῆσος κατέπεσεν.

Cedrenus says the same thing: "In the eighth year [of the reign of Constantius II] the island of Rhodes was destroyed in a great earthquake".

Τῷ η' ἔτει σεισμοῦ μεγάλου γενομένου Ρόδος ἡ νῆσος κατέπεσε.

⟨ 143 ⟩ **346 •Dyrrachium ▷seismic sea-wave?◁**

sources 1 *Exp. tot. mund.* 53; Eus. *Hieron. Chron.* 236f; *Descr. orb. terr.* 53

sources 2 Theoph. 37; Marian. Scot. 3.361; Cedren. 522-3

literature Mazzarino (1984)

catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Morelli (1942); Grumel (1958); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

In his *Chronicon*, Jerome records an earthquake at Dyrrachium in Dalmatia, along with others in Italy: "Dyrrachium was reduced to ruins in an earthquake, and for three days and nights Rome swayed and many towns in Campania were shaken".

Dyrrachium terrae motu conruit et tribus diebus ac noctibus Roma nutavit plurimaeque Campaniae urbes vexatae.

The *Expositio totius mundi et gentium*, which was drawn up around 350-360 AD. says that the city was destroyed as a divine punishment, perhaps by a seismic sea-wave: "Dyrrachium was destroyed by God because of the evil ways of its people, or rather, so it is said, it was swallowed up and did not reappear".

Dyrrachium propter habitantium malitiam a deo destructa, magis vero, ut dicunt, descendit et non apparuit.

The reading *destructa* does not appear in the manuscripts of the *Expositio*, but derives from the *Descriptio orbis terrarum*, which reads: "it was destroyed, and because of the wrath of God it was swallowed up by the deep and did not reappear".

Destructa est et in profundum deo irascente submersa non comparuit.

Other editors have preferred *mari mersa* to *submersa*.

Taking Jerome as his source, Theophanes dates the earthquake to the year of the world 5837 [345 AD]. Cedrenus places it in the ninth year of the reign of Constantius II. Since he became emperor on 9 September 337, that means 345 or 346. Grumel (1958) is inclined to accept 345. Mazzarino (1984, p.701) dates it to 346 on the basis of Jerome, and reminds us of the religious significance attributed to it.

〈 144 〉 **346 ●Allifae, ●Isernia, Rome, ●Saepinum, ●Telesia**

- sources 1 Firm. Mat. Err. 3.5; Eus. Hieron. Chron. 215
sources 2 Theoph. 56; Georg. Mon. 402; Cedren. 522; Ann. Mellic. 489; Ann. S. Rudberti-Salisb. 764
inscriptions CIL 9.2338 = ILS 5691; CIL 9.2638 = ILS 5588; AE 1972, 150; Buonocore (1992)
literature Cantarelli (1903); Philippson (1905); Camodeca (1971); Russi (1971);
Burnand (1984); Mazzarino (1984); *Catalogo epigrafi* (1989)
catalogues Manetti [1457]; Bonito (1691); Abbati (1703); Perrey (1848); Mallet (1853); Capocci (1861);
Schmidt (1881); Mercalli (1883); Baratta (1899, 1901); Galli (1906); Grumel (1958);
Carrozzo *et al.* (1973); Guidoboni (1989)

Jerome writes in his *Chronicon* of an earthquake in Campania which was also felt in Rome: "For three days and nights Rome felt tremors, and many towns in Campania were shaken".

Tribus diebus ac noctibus Roma nutavit plurimaeque Campaniae urbes vexatae.

A useful piece of evidence for dating this earthquake is held to be a reference to frequent earthquakes made by Firmicus Maternus in his *De errore profanarum religionum*: "The whole earth is washed by the waters of the sea and enclosed around by the ocean; the heavens, too, cover it with their lofty vault; winds sweep over it, rain beats down upon it, and it betrays its fear by its frequent tremors".

Terram omnem circumfluunt maria, et rursus inclusa Oceani ambientis circulo stringitur, caeli etiam rotunda sublimitate operitur, perflatur ventis, aspergitur pluviis, et timorem suum assidui motus tremoribus confitetur.

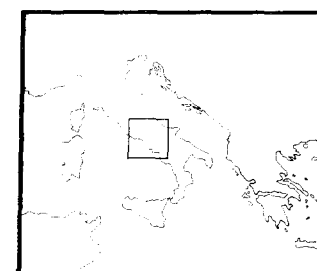
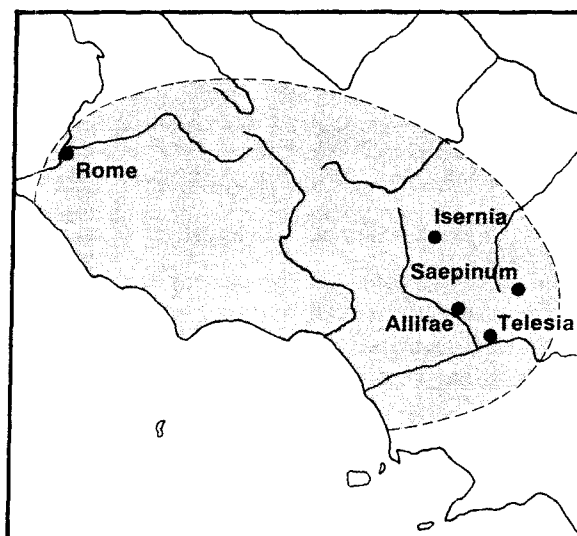
Firmicus Maternus' work was probably written in 346 AD, and it is therefore justifiable to take the view that, in writing it, he was referring to something which had aroused his interest. (For other references to earthquakes in the polemics between Christians and pagans, see Orig. *Math.* 39; Cypr. *Ep.* 75.10; Tertull. *Apol.* 40).

There are three inscriptions which tell of building work carried out by Fabius Maximus and Autonius Justinianus, two governors of Samnium, at Allifae, Telesia and Isernia to repair earthquake damage. We can also add a fourth, fragmentary inscription, which its editor, Buonocore (1992), links to the city of Saepinum (now Altilia, near the modern town of Sepino).

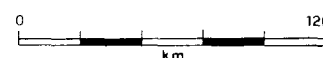
1) An inscription from Allifae, dating to 352-357 AD, now in the Museo Alifano at Piedimonte Matese (CIL 9.2338 = ILS 5691; Camodeca 1971; Russi 1971, pp.322-7; Burnand 1984, pp.175-6, no.6; *Catalogo epigrafi* 1989, p.145): "Fabius Maximus, an eminent senator and governor of the province, completely restored the Baths of Hercules, which had been destroyed by the violence of an earthquake".

Fabius Maximus, v(ir) c(larissimus), rect(or) prov(inciae) / thermas Herculis, vi terrae mo/tus eversas, restituit a fundamentis.

Fabius Maximus was responsible for rebuilding and restoration work carried out in Samnium after the earthquake of 346 AD. Camodeca (1971) dates his work to 352-357 or 356-357 AD. Russi (1971, pp.322-7) dates it to between 352 and 354 or to 356-357. Further bibliographical information will be found in *Catalogo epigrafi* (1989, p.145).



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2) An inscription from Telesia (near the modern town of Telesse), dating to 352-357 AD, now in the Raccolta Pacelli at San Salvatore Telesino (Camodeca 1971; *AE* 1972, 150; Burnand 1984, p.176 no.7; *Catalogo epigrafi* 1989, pp.145-6): "Fab[ius Maximus, distinguished senator], go[vern]or of the province, restored from its foundation[s] the Sabi[ne] baths which had been destroyed by the violence of the earthquake".

Fab[ius Maximus v(ir) c(larissimus)], | rect(or) [prov(inciae), thermas] | Sabi[nianas, vi terrae mo]l[tus e]versas, a fundamen[tis restituit].

The inscription declares that the baths at Telesia were rebuilt by Fabius Maximus, governor of the Province, and that, as in the case of the previous inscription, they had been destroyed in an earthquake. (There is a bibliography in *Catalogo epigrafi* 1989, pp.145-6).

3) An inscription from Isernia, dating to about 350-364 AD. (*CIL* 9.2638 = *ILS* 5588; Burnand 1984, p.176, no.8; *Catalogo epigrafi* 1989, p.146): "At the request of A[u]tonius Justinianus, governor of the Province, Castricius, a man of elevated rank, together with his son Silverius, arranged, at their own expense, the rebuilding of the market, which had collapsed in an earthquake, and they were supplied with columns and tiles by the local authority".

Macellum terrae motibus lapsum | A[u]tonio Iustiniano, rectore | provinciae, dispo[nen]te), | Castricius, vir primarius, | sumptu proprio | fieri curavit cum Silverio filio, | acceptis columnis et tegulis | a re publica.

The inscription can be dated to about 350-364, because of the mention of Autonius Justinianus, who was governor of Samnium after Fabius Maximus. It records the rebuilding of a market destroyed in an earthquake, by a certain Castricius and his son. Since the inscription refers to more than one earthquake — *macellum terrae motibus lapsum* — Burnand (1984, p.176, no.8) thinks the collapse may have been the result of damage caused by the earthquakes of 346 and 365 AD. This view has to be rejected, however, because the epicentre of the 365 earthquake was in the Aegean area. The fact that the inscriptions refer to earthquakes in the plural may be because there was a prolonged period of seismic activity in 346.

4) Buonocore (1992, p.486 and fig.1) recently published a new and very fragmentary Latin inscription found at Tomoliccio, just outside the commune of San Giuliano (in the Province of Campobasso). The inscription is now preserved by the owners of the

Taverna Falasca, which is situated on that part of the Sepino provincial road leading to the Monteverde crossroads. The inscription refers to the restoration of the *macellum* of Saepinum by Autonius Justinianus, governor of Samnium; and on the basis of a comparison with other inscriptions (e.g. *ILS* 5588), Buonocore has suggested the following reading: "Auton[ius Justinianus] governor of the p[rovince] [restored the] marke[t which had colla]p[sed in an earthquake] / ---?".

Auton[ius Iustinianus] / rector p[rovinciae] / macellu[m terrae motum] / [la]p[sum restituit] / ---?

Other inscriptions referring to rebuilding work also carried out by Fabius Maximus at Aesernia, Allifae, Juvanum (near present-day Torricella Peligna), Saepinum and Histonium (Vasto), have been linked to this earthquake. Since, however, none of them specifically mentions an earthquake as the cause of the damage (see Camodeca 1971, and *Catalogo epigrafi* 1989, pp.156-7), it seems sensible simply to indicate their existence. As Mazzarino (1984, p.701) points out, on the basis of Jerome, the date of the earthquake is 346. However, Cantarelli (1903, p.174) gives 345, while Philippson (1905) unsatisfactorily maintains the mistaken dating of 315.

〈 145 〉 348/349 • Berytus

sources 1 Theoph. 39

sources 2 Cedren. 523

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a); Grumel (1958); Hermann (1962); Ben-Menahem (1979); Guidoboni (1989)

This earthquake in Lebanon is only recorded by two late Byzantine writers, namely Theophanes and Cedrenus. The former dates it to the year of the world 5840 [348/9 AD]: "In that year, a powerful earthquake struck Berytus in Phoenicia, and much of the city was destroyed".

Τούτῳ τῷ ἔτει σεισμοῦ γενομένου μεγάλου ἐν Βηρυτῷ τῆς Φοινίκης, τὸ πλεῖστον τῆς πόλεως πέπτωκεν.

Cedrenus places the earthquake in the twelfth year of the reign of Constantius II, i.e. between 9 September 348 and 9 September 349 AD: "In the twelfth year [of the reign of Constantius II] an earthquake destroyed most of the city of Berytus".

Τῷ ιβ' ἔτει σεισμὸς μέγας ἐγένετο ἐν Βερυτῷ τῆς Φοινίκης, ὥς τὸ πλεῖον τῆς πόλεως πεσεῖν.

Grumel (1958) dates the earthquake to 348.

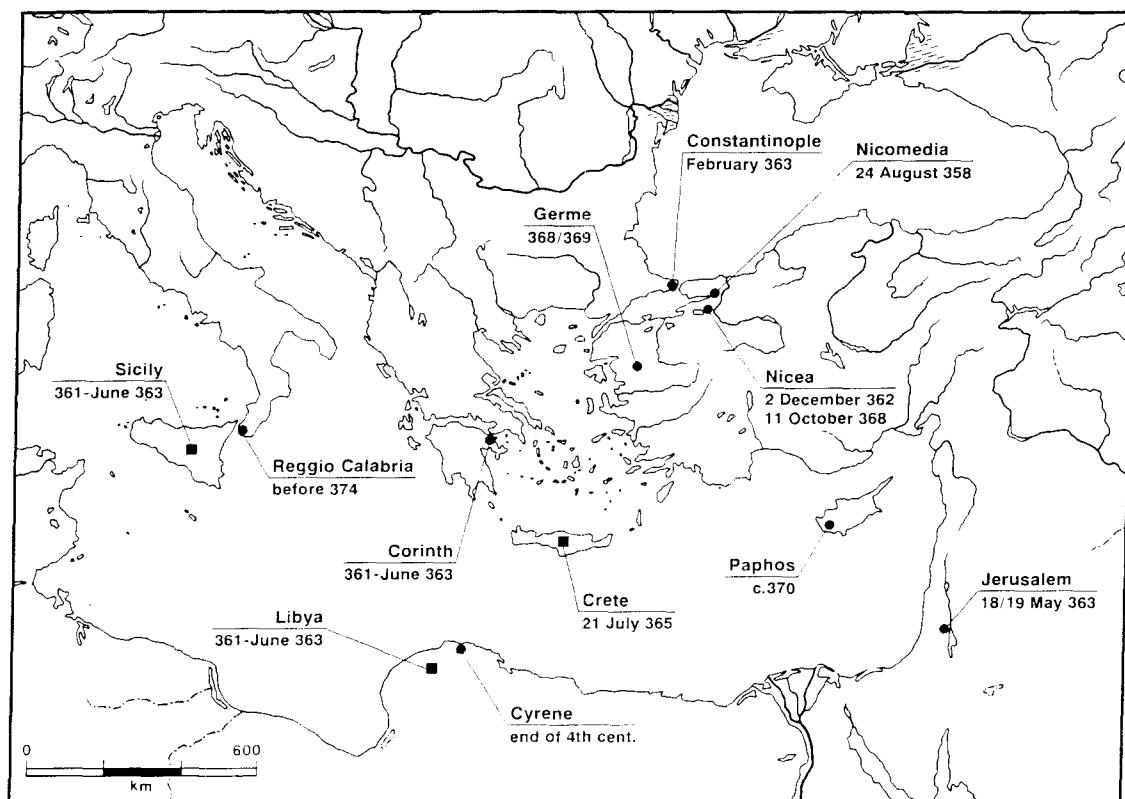
〈 146 〉 second half of the 4th century • Hierapolis (Phrygia)

literature D'Andria (1994, unpublished report on the 1993 excavations)

In the last few years, systematic archaeological investigations have been carried out in the northern part of Hierapolis in Phrygia (present-day Pamukkale, near Denizli in Turkey), under the direction of F.D'Andria of the University of Lecce and under the auspices of the Italian Archaeological Mission in Turkey. During the 1993 excavation campaign, important new information concerning an earthquake in late Roman times was found along the south side of the agora. It was discovered, in fact, that there were collapses in the Ionic marble stoa, with stone blocks from the architrave and cor-

nice lying in line. This earthquake must have been responsible for the abandonment of the very large agora (about 3 hectares) and the subsequent reuse of its travertine blocks in the fortified walls dating to the time of Theodosius (388-395), which were built on top of the stylobate in the ruins of the stoa.

Since the Theodosian fortifications were built at the end of the 4th century, the earthquake must have occurred before then. Although we still lack firm evidence for dating the earthquake, it is likely to have occurred in the second half of the 4th century A.D., when the city was beginning to show signs of the crisis which prevented the rebuilding or partial restoration of the vast agora complex.



Locations of the impressive earthquake sequence which struck the south-east Mediterranean around the second half of the 4th century. In particular, the rapid succession of strong earthquakes from 358 to 365 A.D. probably fostered the impression of an immense disaster which one finds in the literary sources regarding the event of 21 July 365.

< 147 > at about dawn of 24 August 358 ●Nicomedia, Bithynia,
●Macedonia, ●Pontus ▷escape of gas? ◁

- sources 1 Ephr. Nisib. *vers. Arm.* 35.1-2; Amm. 17.7.1-8; Liban. *Or.* 61; Hydat. *descr. cons.* a. 358; *Chron. Pasch.* 293; Theoph. 45
- sources 2 Eus. *Hieron. Chron.* 241a; Philostorg. 4.11; Socr. 2.39; Sozom. *HE* 4.15-6; Theodor. *HE* 2.26; *Cons. Constant.* a. 358; *Chron. Edess.* a. 670; [Dion. Tellmahr.] 170; Marian. Scot. 3.373 *Chron.* 1234 153
- literature Ruge (1936); Renoux (1975); Jacques and Bousquet (1984)
- catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Morelli (1942); Grumel (1958); Hermann (1962); Shebalin *et al.* (1974); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

Many authors (historians, rhetoricians and other men of letters) mention this earthquake, which almost completely destroyed the city of Nicomedia. The correct date seems to be 358. Some texts give the month as August, while the day suggested varies between 22 and 28. The time of day comes from Ephraim of Nisibis. Ammianus' account is the fullest. He records not only the destruction of Nicomedia but also casualties in Macedonia, Asia and Pontus, and he paints a quite dramatic picture of the post-earthquake scene:

"At the same time fearful earthquakes shattered numerous cities and mountains throughout Asia, Macedonia, and Pontus with repeated shocks. Now pre-eminent among the instances of manifold disaster was the collapse of Nicomedia, the metropolis of Bithynia; and I shall give a true and concise account of the misfortune of its destruction. On the twenty-fourth of August, at the first break of day, thick masses of dark clouds overcast the face of the sky, which had just before been brilliant; the sun's splendour was dimmed, and not even objects near at hand or close by could be discerned, so restricted was the range of vision, as a foul, dense mist rolled up and settled over the ground. Then, as if the supreme deity were hurling his fateful bolts and raising the winds from all quarters, a mighty tempest of raging gales burst forth; and at its onslaught were heard the groans of the smitten mountains and the crash of the wave-lashed shore. These were followed by whirlwinds and waterspouts, which, together with a terrific earthquake, utterly destroyed the city and its suburbs. And since most of the houses were carried down the slopes of the hills, they fell one upon another, while everything resounded with the vast roar of their destruction. Meanwhile the hilltops re-echoed with all manner of outcries, of those seeking their wives, their children, and any near relatives. Finally, after the second hour, but well before the third, the air, which was now bright and clear, revealed the fatal ravages that lay concealed. For some who had been crushed by the huge bulk of the debris falling upon them perished under its very weight; some were buried up to their necks in the heaps of rubble, and might have survived had anyone helped them, but died for want of assistance; others hung impaled upon the sharp points of projecting timbers. Most were killed instantly, and where there had been human beings shortly before, were now seen confused piles of corpses. Some were imprisoned unhurt within fallen house roofs, only to die in agony from starvation. Among these was Aristaenetus, vice-governor of the recently created diocese which Constantius, in honour of his wife, Eusebia, had named Pietas; but now he died in agony as a result of the disaster. Others, who were overtaken by the suddenness of the disaster, still lay hidden under the ruins; some with fractured skulls or severed arms or legs hovered between life and death, imploring the aid of others in the same situation; but they were abandoned, despite their strong entreaties. And, the greater part of the temples and private houses might have been saved, and of the population as well, had not a sudden onrush of flames, sweeping over them for five days and nights, burned up whatever could be consumed".

Isdem diebus terrae motus horrendi, per Macedoniam Asiamque et Pontum, assiduis pulsibus oppida multa concusserunt et montes. Inter monumenta tamen multiforium aerumnarum, eminuerunt Nicomediae clades, Bithyniae urbium matris, cuius ruinarum eventum vere breviterque absolvam. Primo lucis exortu, diem nonum Kalendas Septembrium, concreti nubium globi nigrantium, laetam paulo ante caeli speciem confuderunt et emendato solis splendore, nec contigua vel apposita cernebantur; ita oculorum optutu praestricto, humo involutus crassae caliginis squalor insedit. Dein velut numine summo fatales contorquente manubias ventosque ab ipsis excitante cardinibus, magnitudo furentium incubuit procellarum, cuius impetu pulsorum auditus est montium gemitus et elisi litoris fragor, haecque secuti typhones atque presteres cum horrifico tremore terrarum civitatem et suburbana funditus everterunt. Et quoniam acclivi-

tate collium aedes pleraeque vehebantur, aliae super alias concidebant reclangentibus cunctis sonitu ruinarum immenso. Inter quae clamoribus variis celsa culmina resultabant, quaeritantium coniugium liberosque et siquid necessitudines artae constringunt. Post horam denique secundam multo ante tertiam aer iam sudus et liquidus latentes rexit funereas strages. Nonnulli enim superruentium rudrum vi nimia constipati sub ipsis interiere ponderibus; quidam collo tenus aggeribus obruti, cum superesse possent si qui iuissent, auxiliorum inopia necabantur; alii lignorum exstantium acuminibus fixi pendebant. Uno ictu caesi complures, paulo ante homines tunc promiscuae strages cadaverum cernebantur. Quosdam domorum inclinata fastigia intrinsecus serabant intactos angore et inedia consumendos. Inter quos Aristaenetus affectatam recens dioecesis curans vicaria potestate, quam Constantius ad honorem uxoris Eusebiae Pietatis cognominarat, animam hoc casu cruciatam diutius exhalavit. Alii subita magnitudine ruinae oppressi, isdem adhuc molibus conteguntur. Collisis quidam capitibus, vel umeris praeseptis aut cruribus inter vitae mortisque confinia aliorum adiumenta paria perferentium implorantes cum obtestatione magna deserebantur. Et superesse potuit aedium sacrarum et privatarum, hominumque pars maior, ni palantes abrupti flammaram ardores per quinque dies et noctes, quicquid consumi poterat, exussissent.

Ammianus effectively provides the date as 358, since the earthquake is included amongst events occurring during the consulship of Datianus and Cerealis (see Amm. 17.5.1). In Guidoboni (1989, p.676) we made a mistake in stating that Ammianus dated the earthquake to 362: in fact, at 17.6.3, just before the account of the earthquake, Ammianus speaks of a battle against the Juthungi during which the commander, Nevitta, behaved valiantly. Nevitta is reported by Ammianus as having been consul later on, i.e. in 362; but this incidental account has little to do with the chronological context. Ammianus gives a very thorough and detailed description of the earthquake here, and takes advantage of it to provide a lengthy *excursus* on ancient seismological theories.

The evidence provided by Ephraim of Nisibis is of a quite different kind. In his verse sermons (*memre*) he provides a contemporary account of how news of the earthquake reached the Christian community at Nisibis. This is an indirect but detailed account, which seems to derive from evidence (oral or written) provided by the Mesopotamian bishop Vologases. He had been sent to Nicomedia by Ephraim to take part in a council planned for that year, but had been stopped by messengers sent to warn the bishops (see Renoux 1975, p.xxxiii; see also in this connection the ecclesiastical histories of Socrates, Sozomen and Philostorgius).

The *memrē* which Ephraim wrote on the Nicomedia disaster were in Syriac, and have come down to us in a 5th century Armenian translation (only a few fragments of the original survive). The text deals at length with the significance of the earthquake as a divine punishment, but also contains some interesting details about its effects. In *mēmṛā* 7.110-2, we are told that the earthquake occurred at the third hour (which would be about dawn in modern terms: see the passage from Ammianus above): "When the third hour came / at the time when the light is soft / the sun set over the city / which was deprived of light".

ընդ հանդիպել երկից ժամուց, / ի ժամու զի քաղցրալոյս, / եմուտ արեգակն քաղաքին,
/ եւ զրկեցաւ ի լուսոյ.

Mēmṛā 8.219-24 provides some details of the destruction of Nicomedia: "Doors and their frames collapsed / and their sculptures were destroyed. / Fountains were blocked / and those going in and out were killed. / The city collapsed, the earth shook, / its inhabitants found that it was reduced to rubble".

Անկան դրուսք քուովք իւրեանց, / ապականեցան դրաշուածք իւրեանց, / սեղմեցան իբրեւ զաղբերս, հատան մտաւդ եւ ելաւդ:

Further on (297 ff.) he writes: "A cloud of dust gathered over the ruins of the city. / The dust and smoke spread, / both creating darkness. / The air was oppressive and gloomy over the city, so that she herself and her daughter cities all around / were suddenly suffocated. / There was light over neighbouring cities / but only darkness over these. / At the time when the sun shines / a cloud of dust gathered. / Above them created things received light, / but at the time of daylight the light became darkness".

Մէզ [sic: but read Մէզ] փուշույ մաճաւ ի կործանումն քաղաքին, / դիզաւ փոշի հանդերձ ծխով: / ծնաւ երկինք զխաւար: / դժգմնեցաւ [սիշ : բւտ ընադ դժգմնեցաւ] եւ տիրեցաւ աւդ ի վերայ մաւր քաղաքաց: / զի ինքն եւ դստերք որ շուրջ զնովաւ, / հեղձեալք եղեն յանկարծակի: / ի վերայ ընկերաց նոցա լոյս, / ի վերա նոցա միայն խաւար: / Ի ժամու զուարթութեան արեւու, / մաճաւ անդ մէջ փուշույ: / Լուսացան արարածք ի վերայ նոցա, խաւարեաց լոյս ի ժամ լուսոյ:

Libanius' Oration no.61, known as the *Monody for Nicomedia*, is to be related to this earthquake. Apart from using the normal rhetorical *topoi*, which in this case derive from the oration of Aelius Aristides for the Smyrna earthquake of c.178, his oration provides some factual details about the public buildings which collapsed: "There was a great upheaval, and what had been visible was hidden [...] Where are the side streets now? Where are the porticoes, the streets, the fountains, the squares, the schools, the temples, and the happiness of old? Where are the young people? And the elderly? Where are the baths of the Graces and Nymphs, whose noble dimensions were in proportion to those of the whole city? The boule, the demos, the women and children, the basilica and the hippodrome, which was as solid as the walls of Babylon, where are they now?"

καὶ πάντα ἐταράττετο. ἀνεφαίνετο μὲν τὸ κρυπτόμενον. τὸ φαινόμενον δὲ ἀπεκρίπτετο [...] ποῦ νῦν στενωποὶ ποῦ στοαὶ ποῦ δρόμοι ποῦ κρήναι ποῦ δὲ ἀγοραὶ ποῦ μουσεῖα ποῦ τεμένη ποῦ δὲ ὄλβος ἐκεῖνος ποῦ νεότης ποῦ γῆρας ποῦ λουτρά Χαρίτων καὶ Νυμφῶν αὐτῶν. ὧν τὸ μέγιστον ὁμώνυμον βασιλεῖ τῷ ἐκπονήσαντι πόλεως ὅλης ἀντάξιόν ποῦ νῦν βουλή ποῦ δῆμος ποῦ γυναῖκες ποῦ παῖδες ποῦ βασιλείον ποῦ δὲ ἵπποδρομος Βαβυλωνίων τειχῶν ἰσχυρότερος.

Hydatius records that in addition to the destruction of Nicomedia "150 other cities were partly damaged".

Aliae vero cl. civitates partibus vexatae sunt.

Theophanes dates the earthquake to the year of the world 5850 [358 AD]: "[In that year] a violent earthquake struck Nicomedia at about the third hour of the night [c.1 a.m., but see Grumel (1958, p.164) for divergences amongst chroniclers in counting the hours of the night]. The city was damaged and many people died, among them even Cecropius, bishop of the city".

Τούτῳ τῷ ἔτει σεισμοῦ μεγάλου γενομένου ἐν Νικομηδείᾳ περὶ ὥραν τρίτην νυκτερινὴν τὴν πόλιν κατέβαλε καὶ πλήθη πολλὰ διέφθειρεν· συναπώλετο δὲ καὶ ὁ ἐπίσκοπος τῆς πόλεως Κεκρόπιος.

The *Chronicon Paschale* records that the earthquake took place on the 22nd day of the second indiction, during the consulship of Eusebius and Hypatius, i.e. in the year 359: "In the time of these consuls in the month Hyperberetaeus [October] there was a great and violent earthquake in Nicomedia at about the third hour of the night. And the city collapsed and was destroyed, and among others the bishop of the same city, named Cecropius, also perished".

Ἐπὶ τούτων τῶν ὑπάρτων μηνὶ ὑπερβερεταίῳ μέγας γέγονε καὶ σφοδρὸς σεισμὸς ἐν Νικομηδείᾳ περὶ ὥραν γ' νυκτερινήν. καὶ ἡ πόλις κατέπεσε καὶ διεφθάρη, ἐν οἷς καὶ συναπώλετο ὁ τῆς αὐτῆς πόλεως ἐπίσκοπος Κεκρόπιος τοῦνομα.

The details provided here show that this is the same earthquake, so the date provided by the *Chronicon Paschale* must be wrong.

Libanius, Philostorgius, Socrates, Sozomen, Theodoret and the *Consularia Constantinopolitana* all report the earthquake, providing information principally of an anecdotal kind, which is of use primarily for the study of mental attitudes. Sozomen records the scene of destruction as reported by the converted Persian Arsacius, who met his death in the flames at Nicomedia, saying that the information came from oral sources. He also reports that "the earthquake occurred at the second hour of the day, when there was no assembly in the church". In addition to the death of bishop Cecropius, he also records that of an unidentified bishop from the Bosphorus. Theodoret simply says that, because of the earthquake, a previously arranged council was held at Seleucia in Isauria instead, but he speaks of Nicea, not Nicomedia. The confusion may arise from the fact that at the Council of Seleucia (359), the bishops declared in favour of the Nicene Creed.

Grumel (1958, p.477) dates the earthquake to 24 August 358, and distinguishes it from another at Nicomedia in October 359, on the basis of the date in the *Chronicon Paschale*, which he also relates to the evidence of Theophanes; but that refers to 358. Hermann (1962, col.1106) dates the earthquake to 358.

〈148〉 361 – June 363 •Libya

sources Liban. *Or.* 18.292-3

literature Ghislanzoni (1916); Stucchi (1965); Goodchild (1966-67); Lepelley (1984 a); Jacques and Bousquet (1984); Henry (1985)

In the *Epitaph* which he composed for the emperor Julian the Apostate (*Or.* 18.292-3), the Greek rhetorician Libanius, who was alive at the time of the events referred to, mentions Lybia within a very general context in which other Mediterranean countries are also referred to: "Earth, at least, was duly aware of her loss and has honoured our hero with fitting mourning. Like a horse tossing its riders, she has destroyed a great number of cities — many in Palestine, and all those in Libya. The greatest cities of Sicily lie in ruins, as does every city in Greece except one: Nicea the lovely is laid low, and our loveliest of cities [Nicomedia] is shaken and can have no confidence in the future. Such is the honour paid him by Earth or, if you would have it so, by Poseidon: but from the Seasons have come famine and plague, affecting man and beast alike, as though it is not right that creatures upon earth should flourish once he has departed".

Ἡ μὲν γε Γῆ καλῶς τε ἤσθετο τοῦ πάθους καὶ προσηκούσῃ κουρᾷ τὸν ἄνδρα ἐτίμησεν ἀποσεισαμένη, καθάπερ ἵππος ἀναβάτην, πόλεις τόσας καὶ τόσας, ἐν Παλαιστίνῃ πολλὰς, τὰς Λιβύων ἀπάσας. κείνται μὲν αἱ μέγισται Σικελίας, κείνται δὲ Ἑλλήνων πλὴν μίας αἱ πάσαι, κείται δὲ ἡ καλὴ Νίκαια, σείεται δὲ ἡ κάλλει μεγίστη καὶ θαρρεῖν περὶ τοῦ μέλλοντος οὐκ ἔχει. ταῦτα αὐτῷ παρὰ τῆς Γῆς ἢ, εἰ βούλει γε, τοῦ Ποσειδῶνος, παρὰ δὲ αὐτῶν Ὁρῶν λιμοὶ καὶ λοιμοὶ φθείροντες ὁμοίως ἀνθρώπους τε καὶ βοσκήματα, ὥς οὐκ ὄν θέμις ἐκείνου μεθεστηκότος εὐθνεῖν τὰ περὶ γῆν.

Unfortunately, we cannot date with absolute accuracy either the *Epitaph* or the events mentioned in it. The editors of the text of Libanius (P.Petit and A.F.Norman) have suggested that he was referring to the earthquake of 21 July 365, but a careful analysis of his text has led to exclusion of this possibility (Henry 1985).

The emperor Julian died on 26 June 363 AD, thereby dashing the hopes of many pagan

intellectuals (including Libanius), and initiating a difficult period for the empire. For his own rhetorical purposes, Libanius treats natural calamities as omens (this is typical of the culture of the later empire), and is therefore unconcerned about the chronology of events. Some of the cities and regions referred to in the *Epitaph* had been struck by earthquakes at different times: Nicea and Nicomedia on 2 December 362 and Palestine in May 363 (see entries <151> and <153>); both occurred, then, before Julian's death.

On the basis of the wide-ranging text analysis carried out by Henry (1985), it seems that the other localities mentioned by Libanius were also struck by separate earthquakes during the reign of the emperor Julian. The events in question cannot therefore be linked to the earthquake of 21 July 365, because Libanius finished writing the *Epitaph* not later than the early months of that year: the last specific event referred to — the Alemannic raid on the Rhine — occurred in early January 365. Jacques and Bousquet (1984, pp.427ff.) also think that Libanius' evidence about this earthquake certainly predates 21 July 365.

To the suggestion that, using the term Libya, Libanius meant to refer to the whole of north Africa, it might be pointed out in objection that his text is the only source for an earthquake in Africa before 21 July 365, when there was a seismic sea-wave with effects felt in Egypt. This point of view led Lepelley (1984 a, pp.470ff.) to conclude from his analysis of evidence from St. Augustine and Optatus of Milevi that an earthquake could not have occurred in the province of Numidia (and the same could be said of Mauritania); while damage found by archaeologists in Tripolitania could have been caused by the nomad barbarian raids mentioned by Ammianus Marcellinus (28.6.1-30). However, this does not exclude the possibility that Libanius used the term Libya in a more restricted sense, and that a destructive earthquake did indeed strike towns of Libya Pentapolis (Cyrenaica).

Archaeological excavations carried out at Cyrene and Balagrae seem to provide evidence of destruction which could have occurred at this time (Ghislanzoni 1916; Stucchi 1965; Goodchild 1966-67).

<149> 361–June 363 • Sicily

- sources Liban. *Or.* 18.292
- literature Di Vita (1972-73; 1982); Carandini *et al.* (1982); Jacques and Bousquet (1984); Henry (1985)
- catalogues Ligorio [1574-7]; Mongitore (1743); Mercalli (1883); Baratta (1901); Carrozzo *et al.* (1973); Caputo and Fatta (1984); Guidoboni (1989)

Libanius brings together the earthquakes which occurred during the reign of Julian (see entry above), mentioning amongst them a destructive event in Sicily: "Earth, at least, was duly aware of her loss and has honoured our hero with fitting mourning. Like a horse tossing its riders, she has destroyed a great number of cities — many in Palestine, and all those in Libya. The greatest cities of Sicily lie in ruins [...]"

Ἡ μὲν γε Γῆ καλῶς τε ἤσθετο τοῦ πάθους καὶ προσηκούσῃ κουρά τὸν ἄνδρα ἐτίμησεν ἀποσεισασμένη. καθάπερ ἵππος ἀναβάτην, πόλεις τόσας καὶ τόσας, ἐν Παλαιστίνῃ πολλὰς, τὰς Λιβύων ἀπάσας. κείνται μὲν αἱ μέγιστα Σικελίας [...].

An edict issued by the emperor Honorius (395-423) to promote the construction of public buildings in Sicily (*Codex Theodosianus* 1.32) could be linked to this earthquake. Moreover, there is archaeological evidence for damage at about this time at the great late antique villa at Piazza Armerina in central Sicily — damage which was previously attributed to the effects of the earthquake of 21 July 365 (Di Vita 1972-73, pp.251-61 and Carandini *et al.* 1982, pp.52 and 54).

< 150 > **361–June 363 ●Corinth, ●Delphi?, ●Naupactus?, ●Nauplia, ●Greece**

- sources 1 Liban. *Or.* 18.292; Philostorg. *Comm. Art.* 35
sources 2 Zos. 4.18.1-2; Georg. Mon. 560; Cedren. 532, 592
inscriptions IG 4.674; Meritt (1931, no.113)
literature Broneer (1935); Hermann (1962); Williams and Fisher (1976); *BCH* (1976, 1978); *JHS* (1980)
Jacques and Bousquet (1984); Henry (1985)

Libanius brings together the earthquakes which occurred during the reign of Julian (see entries < 148 > and < 149 >), mentioning amongst them a destructive earthquake in Greece: “Earth, at least, was duly aware of her loss and has honoured our hero with fitting mourning. Like a horse tossing its riders, she has destroyed a great number of cities — many in Palestine, and all those in Libya. The greatest cities of Sicily lie in ruins, as does every city in Greece except one [...]”.

Ἡ μὲν γε Γῆ καλῶς τε ἡσθετο τοῦ πάθους καὶ προσηκούσῃ κουρᾷ τὸν ἄνδρα ἐτίμησεν ἀποσεισάμενη, καθάπερ ἵππος ἀναβάτην, πόλεις τόσας καὶ τόσας, ἐν Παλαιστίνῃ πολλὰς, τὰς Λιβύων ἀπάσας. κεῖνται μὲν αἱ μέγιστα Σικελίας, κεῖνται δὲ Ἑλλήνων πλὴν μιᾶς αἱ πασαι [...].

There is similar evidence in Zosimus. In commenting on the situation created by the death of Valentinian I in 375, Zosimus writes: “After his death, a thunderbolt struck Sirmium and burned down both the royal palace and the forum [...] and other earthquakes occurred in some places: Crete, the Peloponnese, and the rest of Greece were severely shaken and many cities were destroyed. Athens and Attica, however, were spared”.

Τούτου τελευτήσαντος ἐμπεσὼν τῷ Σιρμιῷ σκηπτὸς τὰ βασίλεια κατέφλεξε καὶ τὴν ἀγορὰν [...] καὶ σεισμοὶ δὲ ἐν τοῖσι συνηνέχθησαν τόποις. ἐσείσθη δὲ καὶ Κρήτη σφοδρότερον, καὶ ἡ Πελοπόννησος μετὰ τῆς ἄλλης Ἑλλάδος, ὥστε καὶ τὰς πολλὰς διαρρηγῆναι τὼν πόλεων, πλὴν τῆς Ἀθηναίων πόλεως καὶ τῆς Ἀττικῆς.

This seems to suggest that an earthquake occurred in the Peloponnese and Crete area in 375: but the date of the earthquake is very uncertain. What Zosimus has to say (see also Zos. 5.6.2) in fact recalls the words by Libanius (“every city in Greece except one”), the only addition being the reference to Crete.

Hermann (1962, col.1107) dates this earthquake to 366 and takes it to be the earthquake of 21 July 365. In their desire to undermine as much as possible the evidence of a “universal earthquake” in 365, Jacques and Bousquet (1984, p.436) take the view that the date given by Zosimus is correct, and that we have to suppose that there was regular seismic activity in Crete; and, furthermore, the suggestion that it occurred after the death of Valentinian, i.e. in 375. But in our opinion Henry (1985, p.48) is surely nearer the mark in suggesting that Zosimus moved the date of the earthquake. His chronology is, in fact, rather problematic: for he too mentions the fire at the royal palace in Sirmium as occurring after the death of Valentinian I, whereas Ammianus Marcellinus (30.5.16) — a much more reliable source — dates the fire to before the death of the emperor.

Since Zosimus does not bother to mention the earthquake of 365, it would seem that he has brought together two events in order to place greater emphasis on the emperor's death, because in his opinion it was an epoch-making event in the history of the empire. It is therefore, reasonable to think, as does Henry (1985), that the earthquake in Greece mentioned by Libanius and Zosimus must date to before June 363. The reference by Zosimus to Crete can probably be linked to the earthquake of 21 July 365 (see entry < 154 >).

Much the same can be said of a passage in the 11th-12th century writer Cedrenus,

who writes: "During the reign of Gratian [375-382], an earthquake occurred at Alexandria of such violence that the sea receded and ships were left stranded. But when a large crowd of people came to see this unusual sight, the sea rushed back with great force and drowned five thousand people. At the same time, large parts of Crete, Achaia, Boeotia, Epirus and Sicily were also destroyed by the sea-wave, and some ships were hurled a hundred stades [c.18.5 km] from the sea into the mountains". Cedrenus may have been using here a procedure familiar to earlier Byzantine chroniclers (see the remarks about Zosimus above), in inserting into his chapter on Gratian events which actually happened some years earlier (see also Georg. Mon. 560). There may be evidence of an earthquake in Greece during the reign of Julian in the response of the Delphic oracle to Oribasius, who was sent by the emperor to obtain advice before the military expedition against the Persians. The text of the oracle as reported by Philostorgius is, in fact: "Tell the emperor that the beautiful palace is destroyed. It is no longer true that Apollo has a house and a laurel plant for his oracles, and a talking spring: the talking water, too, has drained away".

Εἶπατε τῷ βασιλεῖ· Χαμαὶ πέσε δαίδαλος αὐλά· Οὐκέτι Φοῖβος ἔχει καλύβαν, οὐ μάντιδα δάφνην, Οὐ παγὰν λαλέουσιν, ἀπέσβετο καὶ λάλον ὕδωρ.

There seems to be an implied suggestion here that the temple of Apollo at Delphi had been seriously damaged (see also Cedren. 532). This interpretation is shared by Henry (1985).

Moreover, there are two inscriptions which might be linked to this earthquake. One, from Nauplia (*IG* 4.674) dates to the time of Valentinian and Valens [375-378], and includes the words: "the city raised its head again because, out of goodwill and generosity, he provided the basilica and other buildings with protection against earthquakes and marine disasters" (the text is defective and cannot be entirely translated).

Ἐπὶ Καισάρων Αὐτοκρατόρων Κλαυδίων (sic: but read Φλαβίων) Βαλέντων [---] σχολαστικός, ἅμα τοῖς φιλότατοις φοιτηταῖς αὐτοῦ κατὰ σεισμοὺς καὶ τοὺς θαλαττίους κατακλυσμοὺς σκευασάμενος τὴν βασιλικὴν καὶ τὰ [---] ὄν εὐνοίας ἕνεκα καὶ καλοκάγαθίας ἡ πόλις ἀνέστησε.

The other inscription, from Corinth, was published by Meritt (1931, no.113), and mentions restoration work carried out by "Flavius Valentinianus". It has been linked to the earthquake of 21 July 365 by Broneer (1935, p.65), but in our opinion it relates to the one which occurred before June 363, keeping in mind the hypothesis put forward by Henry (1985, pp.52-3) that the latter particularly affected the towns around the Gulf of Corinth. This hypothesis is supported by some archaeological excavations at Corinth (Williams and Fisher 1976; *BCH* 1976) and Naupactus (*JHS* 1980; *BCH* 1978), the data from which may deserve further analysis in the light of the more general description outlined here.

<151> the evening of 2 December 362 •Nicaea, •Nicomedia

- | | |
|------------|---|
| sources | Liban. <i>Or.</i> 18.292; Amm. 22.13.5;
Ioh. Nik. 78.8-10 (p.183 [203]/310 [430] f. Zotenberg = p.70 f. Charles) |
| literature | Downey (1961); Jacques and Bousquet (1984); Henry (1985); |
| catalogues | Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881);
Hermann (1962); Shebalin <i>et al.</i> (1974); Papazachos and Papazachos (1989); Guidoboni (1989) |

Ammianus records an earthquake at Nicaea and Nicomedia: "Then, on 2 December, just before evening, the rest of Nicomedia was completely destroyed in an earthquake, as well as a considerable part of Nicaea".

Quantum nonas decembris, vergente in vesperam diem, reliqua Nicomedia conlapsa est terrae motu, itidemque Nicaeae portio non mediocris.

As has been seen Libanius (*Or.* 18.292), brings together various earthquakes which occurred in the Mediterranean area between 361 and June 363 (see entries < 148 >, < 149 > and < 150 >), and after talking of Greece, writes: “Nicaea the lovely is laid low, and our loveliest of cities is shaken and can have no confidence in the future”.

κεῖται δὲ ἡ καλὴ Νίκαια, σείεται δὲ ἡ κάλλει μεγίστη καὶ θαρρεῖν περὶ τοῦ μέλλοντος οὐκ ἔχει.

The second reference by Libanius (“our loveliest of cities”) is very probably to Nicomedia (Henry 1985, p.45).

The earthquake mentioned by Ammianus is probably also referred to in a passage in John of Nikiu (quoted here in the Ethiopic translation) though it is dated only in the broadest terms: “And in his days [of Constans, 337-61], moreover, the city of Nicaea, the chief of cities of our three hundred and eighteen Fathers, was overthrown by a great earthquake. And this fell out through the will of God in order that the Arians should not assemble therein to corrupt the holy orthodox faith established by our holy Fathers, the three hundred and eighteen bishops, who assembled formerly in the days of Constantine — a festival of happy memory. And it was for this reason that the wrath of God prevented them. [9] And afterwards there appeared in heaven a sign, that is, the holy cross standing at midday over the holy place where our Saviour Jesus Christ was crucified, at the same time as the arrival of Cyril, patriarch of Jerusalem, and the other bishops who were with him. [10] And Cyril thereupon and the bishops who were with him wrote a letter and sent it to the emperor Constans regarding the great wonder and the great sign which had appeared”.

ወበመዋዕሊሁ፡ ዓፄ፡ ወድቀት፡ ሀገረ፡ ኒቅያ፡ ርእሰ፡ አህጉራት፡ ዘአበዊነ፡ ተጀገወ። በድልቅልቅ፡ ዐቢይ፡ ዘኮነ፡ በትእዛዘ፡ እግዚአብሔር፡ ከመ፡ ኢይትጋብኡ፡ አርዮሳውያን፡ ውስቴታ፡ ለአማከኖ፡ ሃይማኖት፡ ቅድስት፡ አርቶዶክሳዊት፡ ዘአስተናበሩ፡ አበዊነ፡ ቅዱሳን፡ ተጀገወ። ኤጲስቆጶሳት፡ ዘተጋብኡ፡ ቅድመ፡ በመዋዕለ፡ ቈስጠንጢኖስ፡ በዓለ፡ ዝክር፡ ሠናይ፡ ወበእንተዝ፡ ከልኦሙ፡ መዓተ፡ እግዚአብሔር፡ ወእምዝ፡ እስተርአየ፡ ትእምርት፡ ውስተ፡ ሰማይ፡ ዘውእቱ፡ መስቀል፡ ቅዱስ፡ ቀዊሞ፡ በመንፈቀ፡ መዓልተ፡ መልዕልተ፡ መካነ፡ ቅዱስ፡ ኀበ፡ ተሰቅለ፡ ቦቱ፡ መድኃኒነ፡ ኢየሱስ፡ ክርስቶስ፡ እምቅድመ፡ ምጽአቱ፡ ለቁርሎስ፡ ኤጲስ፡ ቆጶስ፡ ዘኢየሩሳሌም፡ ወካልኣን፡ ጳጳሳት፡ እለ፡ ምስሌሁ፡ ወእምዝ፡ ጸሐፊ፡ ቁርሎስ፡ መጽሐፈ፡ መልእክት፡ ምስለ፡ እሊአሁ፡ ጳጳሳት፡ ወፊነዎ፡ ኀበ፡ ንጉሥ፡ ቍስጥንጥንዩስ፡ በእንተ፡ መንክር፡ ዐቢይ፡ ወትእምርት፡ ዐቢይ፡ ዘእስተርአየ፡

< 152 > February 363 Constantinople

sources Lib. *Or.* 18.177; Amm. 23.1.7

literature Jacques and Bousquet (1984); Henry (1985); Montero (1991)

catalogues Bonito (1691); Mallet (1853); Hermann (1962); Guidoboni (1989)

Ammianus follows the classical historiographical tradition in recording prodigies and astronomical events which were supposed to foretell the end of Julian's reign. He also refers to an earthquake at Constantinople, which he says occurred shortly before the Persian campaign: “word came that Constantinople had been shaken by an earthquake”.

Nuntiatum est Constantinopolim terrae pulsu vibratam.

According to Libanius, Constantinople was affected by a series of shocks: “When Poseidon caused earthquakes in the capital of Thrace, messengers came repeatedly with the news that if the god were not appeased, the ruin of the city would be complete”.

ἔσειε μὲν ὁ Ποσειδῶν τὴν μεγάλην ἐν Θράκῃ πόλιν, ἀγγελίαι δὲ ἐφοίτων ὥς εἰ μὴ τις διαλλάξει τὸν θεὸν περιέσται τῆς πόλεως τὸ κακόν.

This non-destructive earthquake can be dated to February 363 (Henry 1985, p.49).

<153> **the night of 18-19 May 363** ●Aina d-Gader, ●Antipatris, ●Areopolis, ●Ascalon, ●Azotus, ●Baishan, ●Beit Gubrin, ●Caesarea, ●Gophna, ●Haifa?, ●Japho, ●Jerusalem, ●Lydda [Diospolis], ●Nicopolis, ●Paneas, ●Petra, ●Samaria [Sebastia], ●Sepphoris, ●Tiberias ▷escape of gas?◁

sources 1 Greg. Naz. *contr. Iul.* 2, pg 35, 668-9; [Cyrill. Hieros.] in Brock (1977); Liban. *Or.* 1.134, 18.292; Hieron. *Comm. Is. PL* 24, 15, c.168; Socr. 3.20; Sozom. 5.22; Theodor. *HE* 3.20
sources 2 Ephr. Nisib. *Hymns against Julian* 4.18-23; *Hist. Church Alex.* 1.42; *Chron. Maron.* 133; *Chron.* 724 133; [Dion. Tellmahr.] 180; *Chron.* 846, 199; Mich. Syr. 4.146
literature Warburton (1750); Brock (1977); Russell (1980); Jacques and Bousquet (1984); Russell (1985);
catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Schmidt (1881); Sieberg (1932 a); Amiran (1950-51); Grumel (1958); Hermann (1962); Ben-Menahem (1979)

In the antipagan polemics which the church fathers unleashed against Julian the Apostate, some emphasis is placed on the prodigies which occurred in Jerusalem after the emperor's decision to rebuild the Jewish temple. What happened plays an important part in the writings of the church fathers and in ecclesiastical histories. Indeed, the Christians of the time took literally the prophecy in St. Matthew's Gospel (24.1ff.), according to which Jesus would prevent the rebuilding of the temple. Gregory of Nazianzus seems to be a contemporary source, and in his *Second Inveective against Julian*, he writes: "Immediately fleeing before both the furious storm and the earthquake, at the nearby temples [...] and everyone tells or claims that while the injured were fighting with one another to reach the exit, fire broke out in the temple, burning them and casting them out [...] But the most striking and miraculous thing of all was a light which rose up in the sky in the form of a cross [...]"

Ὡς δὲ ὑπὸ ἀγρίας λαίλαπος καὶ βρασμοῦ γῆς ἄφνω συναλαθόντες, ἐπὶ τι τῶν πλησίον ἱερῶν, [...] ὁ δὲ ἅπαντες ἤδη καὶ λέγουσι καὶ πιστεύουσιν, ὅτι βιαζομένους αὐτοὺς καὶ φιλονεικοῦντας περὶ τὴν εἴσοδον, πῦρ ἔστησεν ἀπαντήσαν ἐκ τοῦ ἱεροῦ, καὶ τοὺς μὲν κατέφλεξε καὶ ἀνήλωσεν [...] ὁ δὲ ἔτι τούτου παραδοξότερον καὶ περιφανέστερον, ἔσθη φῶς ἐν τῷ οὐρανῷ τὸν σταυρὸν περιγραφόν [...].

This kind of account makes it seem likely that many details were passed on orally (see Brock 1977, p.267).

In his *Ecclesiastical History*, Socrates describes what happened as follows: "and on a night following, a mighty earthquake tore up the stones of the old foundations of the temple, and dispersed them all together with the adjacent edifices. This circumstance exceedingly terrified the Jews; and the report of it brought many to the spot who resided at a great distance. When, therefore, a vast multitude was assembled, another prodigy took place. Fire came down from heaven and consumed all the builders' tools".

καὶ διὰ τῆς νυκτὸς σεισμὸς μέγας ἐπιγενόμενος ἀνέβρασε τοὺς λίθους τῶν πάλαι θεμελίων τοῦ ναοῦ, καὶ πάντας διέσπειρε σὺν τοῖς παρακειμένοις οἰκήμασι. Δέος δὲ ἐκ τοῦ γενομένου Ἰουδαίους κατέλαβε· καὶ φήμη ἐπὶ τὸν τόπον ἦγε καὶ τοὺς πόρρω διάγοντας. Παρόντων οὖν σφόδρα πολλῶν, ἄτερον τεράστιον ἐπιγίνεται. πῦρ γὰρ ἐξ οὐρανοῦ κατασκήψαν πάντα τὰ τῶν οἰκοδόμων ἐργαλεῖα διέφθειρεν.

The accounts of Sozomen, Theodoret and Philostorgius are on similar lines.

where mention of the Temple episode contains an implicit reference to an earthquake: "So they began to build. They built from morning to night. When they returned in the morning they found that what they had built [the previous day] had been destroyed, but not by the hand of man".

ΔΥΑΡΧΕΙ ΔΕ ΝΚΩΤ. ΨΑΥΚΩΤ ΔΙΝ ΖΤΟΟΥΕ ΨΑ ΡΟΥΖΕ. ΝΣΕ ΠΩΖ ΕΖΤΟΟΥΕ, ΝΣΕΘΝ ΝΚΩΤ
ΝΤΑΥΚΟΤΟΥ ΕΥΨΡΩΩΡ ΖΝ ΟΥΘΙΣ ΝΡΩΜΕ ΔΝ.

Russell (1980, p.52) refers to possible obscure allusions in the *Talmud*. In Amiran's catalogue (1950-51, p.225), it was wrongly taken to be the 365 earthquake (see entry <154>). The collapse of some buildings, for which there is archaeological evidence, has been attributed to this earthquake. See the bibliography in Russell (1980, pp.55-7).

Grumel (1958, p.477) does not give an exact date for the earthquake, simply placing it during the reign of Julian. The exact date is in fact May 363, very probably on the 19th (see Brock 1977, p.268).

An odd book was written on this earthquake by the Anglican bishop William Warburton (1750). In it, he thoroughly examined all the Greek and Latin historical evidence in order to explain the earthquake as caused by Divine Providence.

< 154 > **the morning of 21 July 365 • Alexandria, Epidaurus, • Gortyna, Methone, • Panephysis, • Crete, Sicily > seismic sea-wave <**

- sources 1 Amm. 26.10.15-19; Athan. *Ind. Syr. Epist. fest.* 37; Eus. *Hieron. Chron.* 244c; Hieron. *Comm. Is. pl.* 24, 15, 168; Hieron. *V. Hil.* 29.1; *Consul. Constant.* 240; Cassian. *conl.* 11.3; Socr. *HE* 4.3; Sozom. 6.2; *Fasti Vindob.* 295
- sources 2 Oros. *Hist.* 7.32; Zos. 4.18.1-2; Epiph. *HE* 7.15; [Dion. Tellmahr.] 135, 180; Jac. Edess. *Chron.* 220-21; *Chron. Pasch.* 557; Paul. Diac. *Hist. Rom.* 152; Theoph. 56, 87; *Lives of Athanasius*, pg 25, ccx; ccxii; cclxv; Georg. Mon. 560; *Chron. Nestor.* 260; Land. Sagax, *Hist. Rom.* 1.311; Elia Nisib. 103-4; Erimannus Aug. *Chron.* 79; Mar. Scot. 481; Cedren. 592, 609; Glyc. 480; Mich. Syr. 1.292; *Chron.* 1234 169; *Ann. Mell.* 489; Ricob. Ferrar. *Compilatio chron.* 217; Albert. Miliol. *Chron. imp.* 606
- inscriptions Putorti (1912); Comparetti (1914); *Catalogo epigrafi* (1989)
- literature Ghislanzoni (1916); Pace (1949); Gismondi (1951); Di Vita (1964); Manganaro (1972-73); Camerata-Scovazzo (1975); Tamburello (1977); Di Vita (1979-80 [but 1986], 1980); Rebuffat (1980); Dagron (1981); Jacques and Bousquet (1984); Lepelley (1984 a, b); Blanchard-Lémée (1984); Henry (1985); Kenrick (1986); Brakmann (1987); Soren and Leonard (1989); Traina (1989 d); Guidoboni *et al.* (1989); Di Vita (1990); Mazza (1990 [but 1994]); Lepelley (1990 [but 1994]); Pirazzoli *et al.* (1992); Baudy (1992)
- catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a); Heck (1947); Amiran (1950-51); Grumel (1958); Galanopoulos (1960, 1961); Ambraseys (1962 b); Hermann (1962); Shebalin *et al.* (1974); Ben-Menahem (1979); Comninakis and Papazachos (1982); Caputo and Fata (1984); Papazachos and Papazachos (1989); Guidoboni (1989)

This is the most frequently mentioned and debated earthquake of late antique times, to the extent that it has become a particular object of study for ancient historians and archaeologists. In our opinion, our knowledge is now such that we are close to understanding what really happened, and so we set out below in their entirety the reports which are chronologically closest to the event, from works by Ammianus Marcellinus, Athanasius and Jerome; and we have also made a selection of other texts of particular interest.

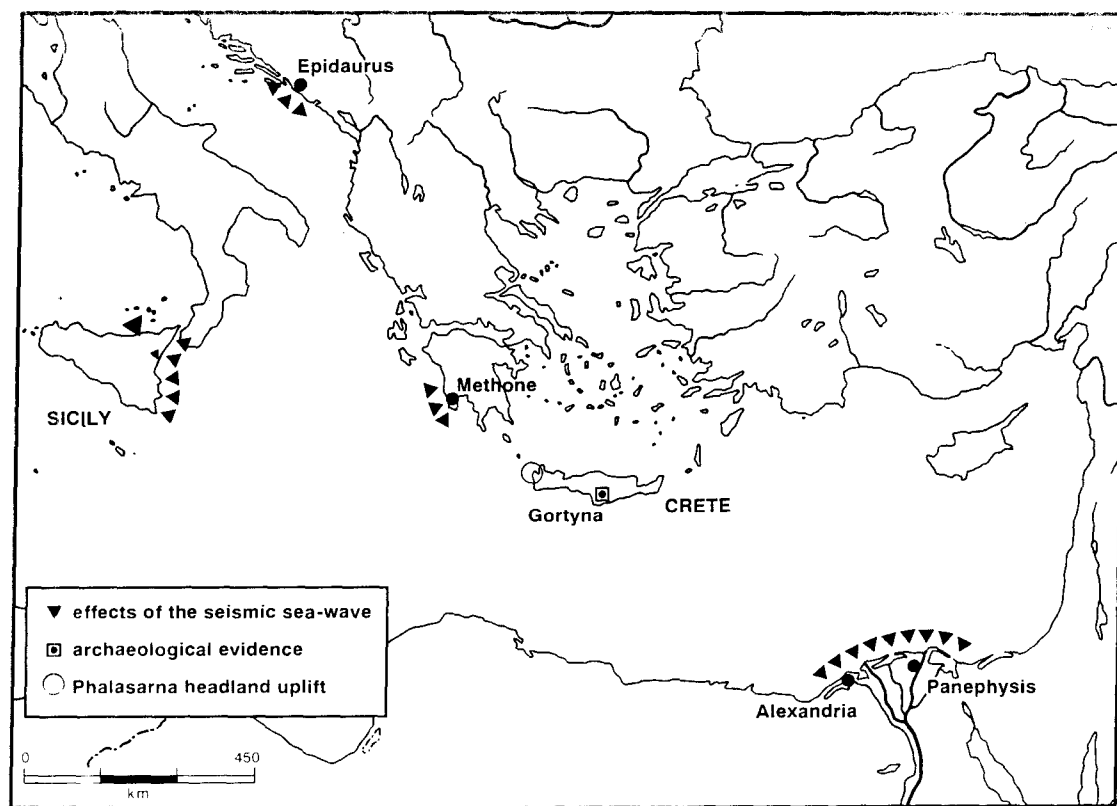
Ammianus, who was then in Antioch and probably collected eye-witness reports, writes: "During the lifetime of that usurper [Procopius], whose many deeds and death

we have recounted, on the twelfth day before the Calends of August [21 July] during the first consulship of Valentinian and his brother [365], terrible disasters took place all of a sudden throughout the world, such as we find neither in legends nor in true historical accounts. For shortly after first light, preceded by heavy and repeated thunder and lightning, the whole stability of the earth was shaken. The sea was driven back and its waters flowed away to such an extent that the deep sea bed was laid bare, and many kinds of sea creatures could be seen embedded in the mud; and great ranges of mountains and valleys, which primaeval Nature had banished beneath the immense waters of the deep, could now for the first time (or so we may think) gaze upon the rays of the sun. Many ships were therefore stranded as if on dry land, and many people wandered freely through the little water that was left, gathering fish and similar creatures; but the growling waters, as though unwilling to be pushed away, rose up in their turn and, bursting through the seething shallows, over islands and stretches of land, flattened many buildings in the towns or wherever they were encountered. Thus was the face of the earth changed by the furious discord of the elements, and it offered strange sights. For the huge masses of water flowed back when least expected, and now overwhelmed and killed many thousands of people; and when the fury of the waters subsided, some ships were seen to have been destroyed by the rapid whirlpools created by the retreating waters, and the dead bodies of the shipwrecked floated face up or down. Some great ships were hurled by the fury of the waves on to roof tops (as happened at Alexandria), and others were thrown up to two miles from the shore. We ourselves on our travels saw a Spartan ship disintegrating after long decay near the town of Mothone".

Hoc novatore adhuc superstite, cuius actus multiplices docuimus et interitum, diem duodecimum Kalendas Augustas, consule Valentiniano primum cum fratre, horrendi terrores per omnem orbis ambitum grassati sunt subito, quales nec fabulae nec veridicae nobis antiquitates exponunt. Paulo enim post lucis exortum, densitate praevia fulgorum acrius vibratorum tremefacta concutitur omnis terreni stabilitas ponderis mareque dispulsum retro fluctibus evolutis abcessit, ut resecta voragine profundorum species natantium multiformes limo cernebantur haerentes, valliumque vastitates et montium tunc (ut opinari dabatur), suspicerent radios solis, quos primigenia rerum sub immensis gurgitibus amendavit. Multis igitur navibus velut arida humo conexis, et licenter per exiguas undarum reliquias palantibus plurimis, ut pisces manibus colligerent et similia, marini fremitus velut gravati repulsam, versa vice consurgunt, perque vada ferventia insulis et continentis terrae porrectis spatiis violenter illisi innumera quaedam in civitatibus, et ubi reperta sunt aedificia, complanarunt; proinde ut elementorum furente discordia, involuta facies mundi, miraculorum species ostendebat. Elapsa enim aequorum magnitudo cum minime speraretur, milia multa necavit hominum et submersit, recurrentiumque aestuum incitata vertigine quaedam naves, postquam umentis substantiae consenuit tumor, pessumdatae visae sunt, exanimataque naufragiis corpora supina iacebant aut prona. Ingentes aliae naves, extrusae rabidis flatibus culminibus insedere tectorum, ut Alexandriae contigit et ad secundum lapidem fere procul a litore contortae sunt aliquae, ut Laconicam prope Mothonen oppidum nos transeundo conspeximus, diuturna carie fatiscentem.

Ammianus' personal experience concerning Methone perhaps derives from his journey from Antioch to Rome after the death of Valens, which occurred in 378 (see Henry 1985, p.39).

Another contemporary writer is Jerome, who mentions the earthquake in three texts: the *Chronicon*, the *Commentary on Isaiah* and the *Life of St. Hilarion*. In his continuation of the *Chronicon* of Eusebius, written about 380 A.D., Jerome records: "There was an earthquake throughout the world, and the sea flowed over the shore, causing suffering to countless peoples in Sicily and many other islands".



Synthesis of the effects of the earthquake and seismic sea-wave of 21 July 365 at the present state of knowledge, according to the written sources, the archaeological data and to the geological indications.

Terrae motu per totum orbem, mare litus egreditur, et Siciliae multarumque insularum innumerabiles populos opprimit.

Jerome also mentions the seismic sea-wave of 21 July 365 in his *Commentary on Isaiah*, where he links it to an earthquake at Areopolis, on the border between Arabia and Palestine, which actually occurred in May 363 (see entry (153) above).

Then, in the *Life of St. Hilarion*, Jerome speaks of the effects of the seismic sea-wave in the locality of Epidaurus (present day Cavtat) in Dalmatia: "Then there was a universal earthquake after the death of Julian, which caused the seas to overflow and, as though God were threatening a new Flood or everything were returning to primitive chaos, ships were hurled on to the rugged mountains and remained suspended there. When the people of Epidaurus saw this, they were struck with fear that the huge billows and breakers and waves as high as mountains would crash down on the shores — as was already happening, as far as they could see — and completely destroy their town. So they went in to the old man, and took him to the shore, as though they were going to war. He drew the sign of the cross three times in the sand and held out his hands towards the sea and, amazingly, the sea swelled up to an enormous height, and then stopped in front of him, and after roaring for a long time as though expressing its rage at a barrier, it gradually flowed back to its own bed".

Ea tempestate terrae motu totius orbis, qui post Iuliani mortem accidit, maria egressa sunt terminos suos, et quasi rursum Deus diluvium minaretur vel in antiquum chaos redirent omnia, naves ad praerupta delatae montium pependerunt. Quod cum viderent Epidaureti, frementes scilicet fluctus et undarum moles et montes gurgitum littoribus inferri, verentes quod iam evenisse cernebant, ne oppidum funditus subverteretur, ingressi sunt ad senem, et quasi ad proelium proficiscentes posuerunt eum in littore. Qui cum tria crucis signa pinxisset in stabula manusque contra tenderet, incredibile dictu est, in quantam altitudinem intumescens mare ante eum steterit, ac diu fremens et quasi ad obicem indignans paulatim in semetipsum relapsus est.

the Mediterranean basin. It might be suggested that this extensive sea-wave was caused by an earthquake having its epicentre near the island of Crete, and indeed some sources, although late, seem to support such hypothesis. Among them are Zosimus, Georgius Monachus, Cedrenus (see entry < 150 >), and the anonymous *Life of Athanasius* (PG 25, ccx) which states that in 365 more than one hundred cities were destroyed in Crete by an earthquake.

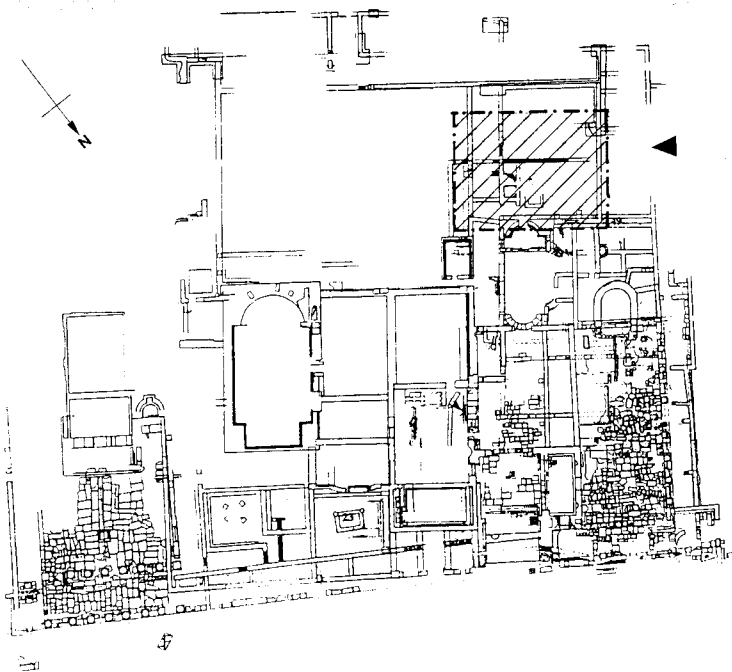
This earthquake was given great emphasis in later sources, and later historians — particularly if they were Christian — tried to incorporate it in their own moral interpretation of events. Sozomen was the first author to link the description of the earthquake of 21 July 365 with the one of the earthquakes which had previously occurred during the Julian's reign (see entries < 148 >, < 149 >, < 150 >, < 151 > and < 153 >), and he was responsible for initiating the enduring tradition which extended the effects of the earthquake of 365 to a large part of the Mediterranean basin. (A recent historical-philological analysis of Sozomen's text can be found in Mazza 1990 [but 1994]).

In his *Ecclesiastical History* (composed between 439 and 450), Sozomen writes: "Throughout the period of his reign [i.e. that of Julian], God certainly made clear his displeasure and caused many calamities to fall on a number of Roman provinces. He shook the earth with such fearful earthquakes that houses collapsed, abysses kept opening up everywhere, and there was no more safety in the open air than indoors. From what I have heard, I conjecture that it was during the reign of this emperor, or, at least, when he occupied the second place in the government [355-361], that a great calamity occurred near Alexandria, when the sea first receded and then overflowed with such sudden force that it flooded the mainland to a great distance, and even boats were found on rooftops".

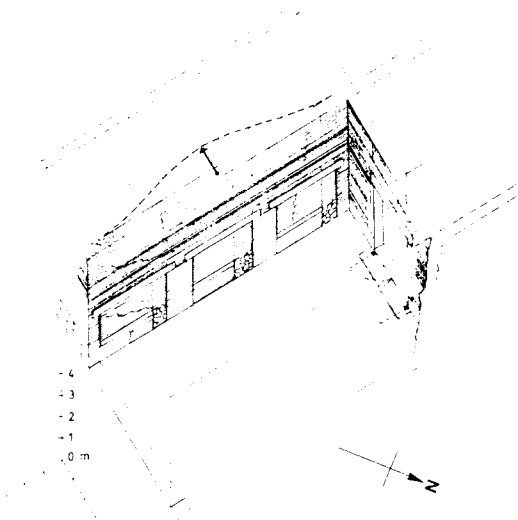
Sozomen continues remembering that in his time the anniversary of the earthquake had still been celebrated every year in Alexandria. This information is confirmed by a Coptic text of the late 6th century which remembers the Alexandrine feast of 27 Epeiph (21 July) "the day of fear" (see Brakmann 1987 and Mazza 1990 [but 1994]).

The information provided by the sources suggests that this was a seismic event of vast proportions. The particular historical and political circumstances of the time (the death of the emperor Julian in 363 A.D. putting an end to any attempt to establish the hegemony of pagan culture) probably encouraged ancient Christian historians to interpret it as a focal point in relation to subsequent events. Its great magnitude was probably made all the more impressive by the effect of the enormous associated sea-wave and so caused it to be seen as an epoch-making event, as also happened in the case of other earthquakes in Byzantium (see Dagron 1981). The frequency with which it is mentioned in late antique and medieval writers led to a lively debate amongst writers of modern times. From the 6th century onwards, chroniclers were already looking far and wide for traces of this "universal earthquake", for they failed to appreciate that in using that phrase, St. Jerome really only intended to indicate that the enormous damage it caused qualified it as a "cosmic" disaster, which is to say one whose consequences were widespread rather than limited to the area of a single municipality.

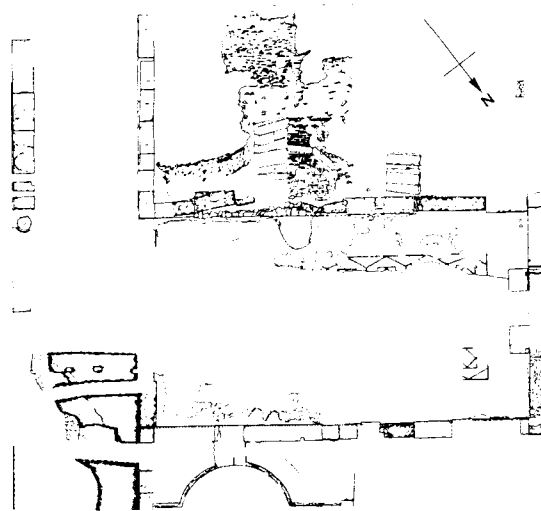
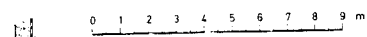
The debate over the year 365 is of more than marginal interest, because it obliges us to deal with complex questions of methodology in the interpretation of sources. In our opinion, it is this aspect of the matter which has made the problem emblematic. The lively debate between archaeologists and historians has at least had the effect of establishing a dialogue which is worth pursuing, in spite of all its difficulties. The two ways of analysing ancient sources appear to clash, but in fact they have points of similarity. Jacques and Bousquet (1984) would surely have been more convincing if their examination of the sources had been slightly less positivistic, and if they had accepted that archaeological data also form part of the "conjectures" used by historians. In spite of these limited reservations of ours, however, we have to remember that the



Gortyna (Crete). General plan of the Praetorium complex. The hatched area is that covered by the first sounding. The building was converted to baths around the end of the 1st century. In later centuries it underwent further modifications: the west entrance fell into disuse, and the side cubicle openings were closed off.



Axonometric projection showing a reconstruction of the entrance to the baths (first stage): notice the south-west internal wall, with an indication of the direction of the collapse related to the 365 earthquake.



In the second half of the 4th century, the south wall collapsed: the ruins have been found *in situ* (U.S. 639). The collapse has been attributed to the earthquake of 21 July 365 (unpublished data).

Archaeological investigation of the Praetorium by the Scuola Archeologica Italiana at Athens is directed by Antonino Di Vita, who has kindly made this unpublished data available. The first sounding in the 1990-91 excavation campaign (south-west part of the complex) was directed by E. Lippolis. Measurements and drawings by N. Masturzo.

contribution made by Jacques and Bousquet (1984) is of fundamental importance to discussion of source criticism. They considered the cultural reasons which led 4th and 5th century historians to nurture the myth of the "universal" earthquake. The fact that we know "why" the earthquake was so famous, does not in any way reduce its impact as a physical phenomenon. Our awareness of this is now accompanied by scientific information which allows us to make more positive suggestions as to its physical nature than was possible in the past. We have in mind, in particular, the data established by Pirazzoli *et al.* (1992) concerning the uplift at the Phalasarna headland on the west coast of Crete.

The hypothesis that the earthquake epicentre was to the south of Crete was put forward by Jacques and Bousquet (1984), and criticised by Guidoboni *et al.* (1989): but these were no more than conjectures. Now, however, it is possible to advance a new and more reliable hypothesis also based on biological indicators (remains of marine microfauna) found by Pirazzoli *et al.* (1992). They discovered an 8 m uplift in the western area of Crete, and provided information which limits the epicentral area to at least the central part of Crete. The fact that the uplift occurred in a single movement seems to bear witness of an extensive seismic sea-wave, which we can identify as the one that followed the earthquake of 365 and left such an impression at the time.

Further investigations *in situ* are needed in order to establish the dimensions of the structure subjected to uplift, for the Phalasarna headland is only part of it. We would need far more geophysical and geological data in order to construct a mathematical model of the earthquake and to simulate the effects of the seismic sea-wave on Mediterranean coastal areas. Seismic events of similar dimensions and involving uplift of a similar kind are, of course, known to seismology, and they are generally reckoned to have had very high magnitudes (from 7 to 8). What we are beginning to see clearly, then, is that while the earthquake was no doubt destructive in Crete, it could scarcely have been destructive in other Mediterranean areas (we can therefore exclude collapses in Cyprus, north-west Africa and Sicily). Recent excavations at Gortyna, in the south-central part of Crete are beginning to point to collapses of important structures datable to about 365 AD. (see figures on p.272; see also Di Vita 1979-80 [but 1986]).

Lepelley (1984 a, b; 1990 [but 1994]) makes an important point about north-west Africa which deserves our consideration. He points out that we have an exceptionally rich corpus of literary and epigraphic information for the 4th century, which should allow us to identify direct or indirect references to any damage caused by the earthquake of 365 AD. There are two particular literary sources which Lepelley uses to show, *ex silentio*, that north-west Africa did not suffer any damage from this earthquake: a work written in 366-367 AD by Optatus, bishop of Milevi (present-day Mila in Algeria), against the Donatist schismatics and the *Confessions* of St. Augustine, who was living at Thagaste (present-day Souk-Ahras in Algeria) at the time. This latter provides a very accurate diary of events. Lepelley also examines 76 inscriptions, relating to the whole of North Africa, which mention construction or restoration work between 364 and 383 AD. His critical examination leads him firmly to exclude the possibility that these inscriptions can be used as evidence of damage resulting from the 365 AD. earthquake, for he thinks that the construction work referred to in them is to be explained in other ways (see also *Catalogo epigrafi* 1989, pp.161-5, nos.9-34).

It is well known that many archaeologists have explained collapses that they have discovered as caused by this earthquake; and this game of "hunt the earthquake" has become particularly popular in recent years. It is therefore worth tracing the archaeological history of the earthquake, now that the *querelle* has been settled.

If we look at the bibliography of research into the archaeological aspects of the earthquake of 21 July 365, we notice certain salient characteristics. In particular, there is a radical turning point in research in the year 1964, when A.Di Vita expressed the

archaeological
literature

cautious opinion that the damage to Mausoleum B at Sabratha had been caused not so much by Austoriani raids (as had been thought until then) as by the 365 earthquake. Until that time, most of the very few theories which had placed any emphasis on the 365 earthquake had been of a historical kind (Putorti 1912; Pace 1949), and lacked any archaeological support at all. Where there was archaeological evidence, before 1964, of destruction caused by earthquakes, a generic dating to the second half of the 4th century AD. was inevitably suggested (Comparetti 1914; Ghislanzoni 1916; Gismondi 1951).

After Di Vita had made his initial suggestion, he himself tracked down evidence of the earthquake in other cities, and he was followed by many other scholars who, on the one hand provided chronological evidence of a quite satisfactory kind, and on the other, claimed to find earthquake damage where in fact there was no evidence of destruction by natural catastrophe at all. A typical case in point is Manganaro's suggestion (1972-73) about the *Sophiana statio*, (in central Sicily) and there may be another example relating to Palermo (Camerata-Scovazzo 1975; Tamburello 1977), all of which can probably be explained as "conditioning" or "scientific suggestion".

It is to Di Vita's credit that he used this case to make possible the initiation of a wide-ranging discussion among archaeologists and historians, for he was the first to indicate the extraordinary importance of archaeological data as sources for historical seismology. When making a general consideration of archaeological aspects of the matter, the following points must be kept in mind:

- 1) the chronological data provided by archaeological research do not permit a dating *ad annum*; even though archaeologists' time-scales are based on the year; they can determine *post* or *ante quem* limits and therefore chronological spans;
- 2) even though chronological data may be sound in themselves, they may be conditioned by the interpretation of the archaeologist or the person who publishes the excavation (as happened in the case of Kenrick 1986, who altered the interpretation of those who carried out the excavation);
- 3) a substantial change in archaeological excavation methodology took place in the 1960s.

The ever increasing use of stratigraphic excavations over large areas has led to a substantial improvement in establishing time scales at the various sites, and in some cases has brought about a clear modification to datings which had previously been taken as correct (as in the case of the Kourion earthquake — see Soren and Leonard 1989). The problem lies, of course, in excavations carried out by other methods and with other aims (mostly earth excavations). Unfortunately, the data they provide are generally speaking quite useless when it comes to establishing a chronological sequence.

< 155 > **11 October 368 •Nicaea, Bithynia ▷seismic sea-wave◁**

sources 1 Greg. Naz. *Serm.* 7.15, ep. 1.20; Eus. *Hieron. Chron.* 245f; Socr. 4.10-1; Mal. 342-3; *Chron. Pasch.* 301; Ioh. Nik. 82.19 (p.97 [217]/325 [445] Zotenberg = p.84 Charles)

sources 2 *Cons. Constant.* a. 368; Sozom. 6.10.2; [Dion. Tellmahr.] 181; Niceph. Call. 11.4; Elia Nisib. 102; Mich. Syr. 1.295

literature Henry (1985)

catalogues Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Grumel (1958); Hermann (1962); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

About the year 368, Nicaea was completely destroyed by an earthquake. The disaster is often recorded even in very late chronicles, because of the fame acquired by the city through the ecumenical council held there in 325.

In his *Historia Ecclesiastica*, Socrates records the earthquake as follows: "In the next

year, when Valentinian and Valens were consuls for the second time [368], an earthquake occurred in Bithynia on 11 October and destroyed the city of Nicea. This was about twelve years after Nicomedia had been visited by a similar catastrophe".

Τῇ δὲ ἑξῆς ὑπατεία, ἣτις ἦν Οὐαλεντινιανοῦ τὸ δεύτερον καὶ Οὐάλεντος τὸ δεύτερον, σεισμὸς περὶ τὴν Βιθυνίαν γενόμενος, Νίκαιαν τὴν πόλιν κατέστρεψεν τῇ ἑνδεκάτῃ τοῦ μηνὸς ὀκτωβρίου. τοῦτο ἦν δωδέκατον ἔτος μετὰ τὴν Νικομηδείας πτώσιν.

The fact that the two earthquakes are mentioned together is due to the rivalry between Nicea and Nicomedia. Elias of Nisibis, whose source is Socrates, wrongly states that the earthquake at Nicomedia occurred on 28 Ab 669 [i.e. August 368].

The *Chronicon Paschale* records the earthquake as having occurred on 11 October 368 AD, the fourth year of the 287th Olympiad: "In the time of these consuls an earthquake occurred in the city of Nicea and razed it to the ground. It happened in the month of Gorpiaeus, on the fifth day before the Ides of October [11 October]".

Ἰνδ. ια'. δ'. ὑπ. Οὐαλεντινιανοῦ Αὐγούστου τὸ β' καὶ Οὐάλεντος Αὐγούστου τὸ β'. ἐπὶ τούτων τῶν ὑπᾶτων σεισμὸς ἐγένετο εἰς τὴν πόλιν Νικαίας, ὥστε αὐτὴν καταστραφῆναι, μηνὶ γορπιαίῳ πρὸ ε' ἰδῶν ὀκτωβρίων.

Malalas gives a different sequence of events: "During his reign [that of Valens] the city of Nicea in Bithynia suffered from the wrath of God in the month of September of the 11th indiction [367 AD]."

Ἐπὶ δὲ τῆς βασιλείας αὐτοῦ ἔπαθεν ὑπὸ θεομηνίας Νίκαια, πόλις τῆς Βιθυνίας, μηνὶ σεπτεμβρίῳ ἰνδικτιῶνος ια'.

John of Nikiu (quoted here in the Ethiopic translation) also records a seismic sea-wave: "And in the days of this abominable [Valens] there was an earthquake in the city of Nicea where the holy council had been held. For the sea rose against it and overwhelmed it".

ወበመዋዕሊሁ፡ ለዝንቱ፡ ርኩስ፡ ኮነ፡ ድልቅልቅ፡ በሀገረ፡ ኒቅያ፡ ዘኮነት፡ ባቲ፡ ጉባኤ፡ ቅዱስ፡ እስመ፡ ባሕር፡ ዐርገ፡ ላዕሌሃ፡ ወከደና፡፡

Since Malalas (who only speaks of "the wrath of God") is John of Nikiu's source, it is not impossible that the seismic sea-wave mentioned by the latter occurred in September 367, and is therefore quite separate from the earthquake of 11 October 368. Gregory of Nazianzus refers to this earthquake in a letter to his brother Caesarius, who was at Nicea when the earthquake occurred. Caesarius died shortly afterwards. In an encomium written in memory of his brother, Gregory recalls his deeds of bravery and compassion during the earthquake.

〈156〉 368/369 ●Germe

sources 1 Socr. 4.11

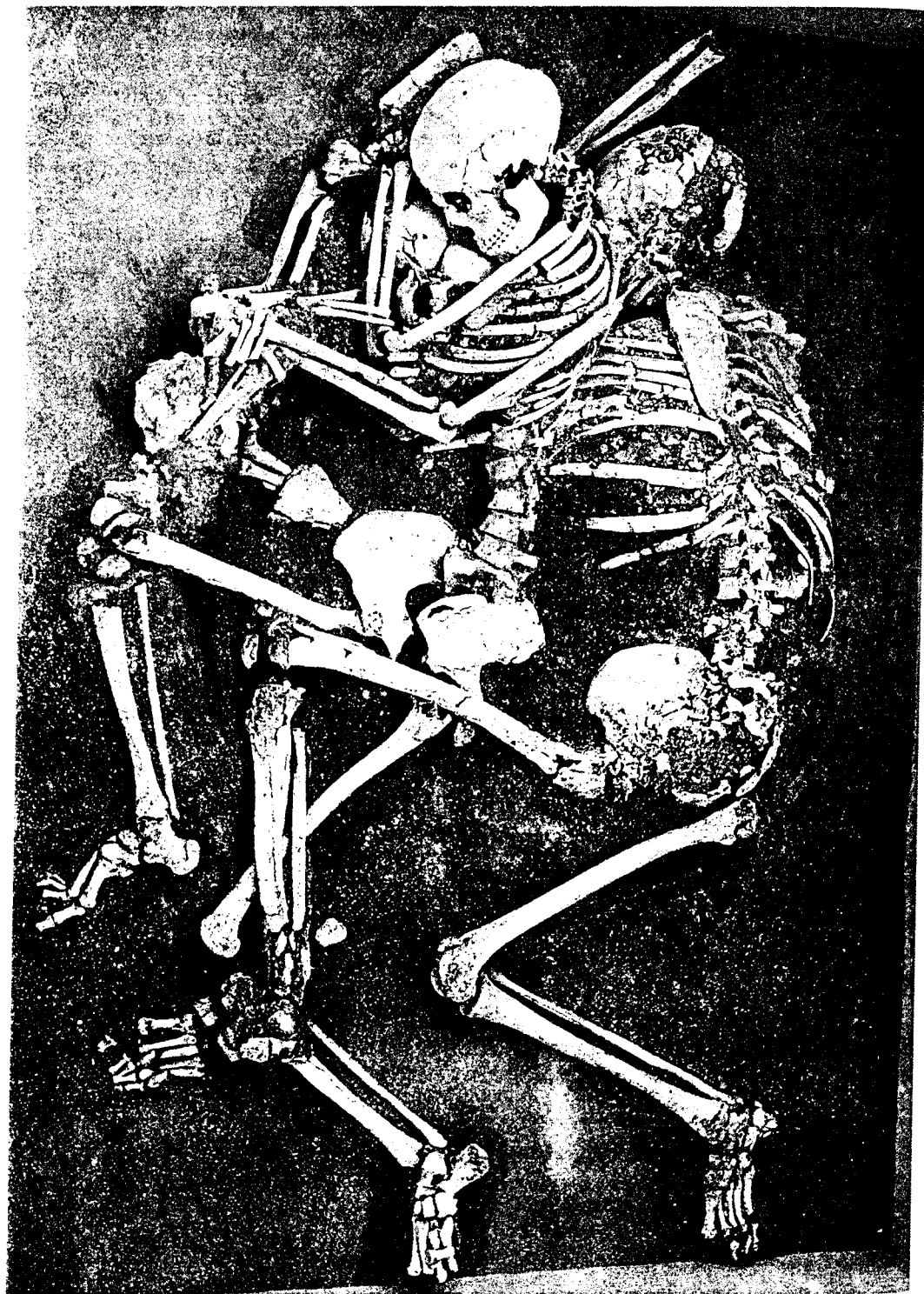
sources 2 Niceph. Call. 11.4; Georg. Mon. 560

literature Jacques and Bousquet (1984)

catalogues Ligorio [1574-7]; Bonito (1691); Mallet (1853); Grumel (1958); Guidoboni (1989)

In the same chapter of the *Historia Ecclesiastica* in which he records the Nicea earthquake of 368, Socrates tells of another earthquake, in the Hellespont. He specifies that these disasters were interpreted as signs of upheaval in the Church, troubled as it was by internal strife and persecution: "Soon afterwards most of Germe in the Hellespont was reduced to ruins by another earthquake".

Ὀλίγον δὲ μετὰ τόνδε τὸν σεισμόν καὶ Γέρμης τῆς Ἑλλησπόντου τὰ πολλὰ μέρη ὑπὸ τοῦ ἑτέρου σεισμοῦ κατήνεχθη.



Kourion (Cyprus). Skeletons found during excavation of the large house between 1984 and 1987. The three members of the family are united in one last desperate embrace, and were probably victims of the earthquake which struck several towns in Cyprus in about 370 including Paphos, which is about 50 km from Kourion (© Martha Cooper).

Georgius Monachus confuses this earthquake with that of 365 (see entry < 154 >), and also repeats a chronicler's mistake (Malalas?) by placing it during the reign of Gratian. Grumel (1958, p.477) dates the earthquake to 368 or 369.

< 157 > **c.370 ●Paphos, ●Cyprus**

- sources Liban. *Or.* 2.52; Greg. Nyss. *PG* 45.108; Hieron. *V. Hilar.* 30.2
- literature Soren (1981, 1985); Jensen (1985); Michaelidou-Nicolau (1985); Soren *et al.* (1986); Soren and Leonard (1989)
- catalogues Schmidt (1881); Guidoboni (1989)

Libanius, writing around 380/1, refers to an earthquake in Cyprus which had aroused the compassion of the people of Antioch: "We are not Cypriots, and we have not yet seen our city laid low by earthquakes — heaven forbid — but nevertheless you can hear many people moaning and lamenting 'Alas, poor cities! Where on earth are you now?' and no one has reproved us for thinking that we shared in the disaster, though separated from the island by such a stretch of sea".

Οὐκ ἔσμεν Κύπριοι οὐδέ, σὺν Ἀδραστεία δὲ εἰρήσεται, τῷ σεισμῷ κατενεχθεῖσαν ἐπείδομεν τὴν πόλιν, ἀλλ' ὅμως οἰμωγαὶ καὶ ὀδυρμοί, καὶ ὧ πόλεις, ποῦ ποτε ἄρ' ἔστέ; Πολλῶν ἦν ἀκούειν λεγόντων, καὶ οὐδεὶς ἐπέπληξεν εἰ τοσαύτη τῆς νήσου διειργόμενοι τῇ θαλάσσῃ μετέχειν τῆς συμφορᾶς ἐνομίζομεν.

Jerome mentions that earthquakes were frequent at Paphos and that it was in ruins in his day, though not when Hilarion visited it: "So he entered Paphos, that city in Cyprus which has been made famous by the poets. It has frequently been destroyed by earthquakes, and now has only ruins to show what it once was".

Ingressus ergo Paphum urbem Cypri nobilem carminibus poetarum quae frequenter terrae motu lapsa, nunc ruinarum tantum vestigiis quid olim fuerit, ostendit.

Bearing in mind that, according to Jerome, Hilarion had been in Epidaurus in the years immediately before this (see entry < 154 >), we may date this earthquake to 370, whereas Libanius' oration can be dated to about 380/1. The frequent earthquakes referred to probably include the one which occurred in 17 B.C. (see entry < 074 >), and almost certainly that of 77 A.D. (see entry < 101 >), since Paphos may well be one of the "three cities of Cyprus (*tres civitates Cypri*) mentioned by Eusebius.

The evidence provided by Gregory of Nyssa is rather vague. In fact, he refers very vaguely to earthquakes as having occurred on Mt.Sangarius, in Bithynia, Paphlagonia, Cyprus, Pisidia and Greece. Ever since the time of Clinton's *Fasti Romani* (1.408), Gregory's evidence has been taken to refer to occurrences in those years, especially the Neocaesarea earthquake (see entry < 141 >) and the Rhodes earthquake of 344 (see entry < 142 >). But Gregory of Nyssa was writing around 380 — i.e. long afterwards — and his evidence is therefore not entirely trustworthy. And in any case, these are allusions to various earthquakes; for in Bithynia, both Nicomedia and Nicea were frequently struck by earthquakes in the 4th century. As for Pisidia and Paphlagonia, we have no evidence of earthquakes close to the time concerned, and so it is not possible to provide confirmation of Gregory of Nyssa's vague allusion.

The problem of earthquakes in Cyprus has been studied by the archaeologist D.Soren on a number of occasions. In excavating Kourion, he found traces of major collapses during the 4th century (see the discussion of the sources for the earthquakes at Salamis in Cyprus in 332 and 342 in entries < 136 > and < 140 >). Soren and his colleagues first thought that the collapses were related to an earthquake which had occurred between 364 and 370, the *terminus post quem* being provided by some coin finds, and the *terminus ante quem* by the evidence of Jerome: see Soren (1981, 1985).

Later on, Soren was influenced by archaeological studies on the earthquake of 365 (see entry < 154 >), and especially by the research of N.N.Ambraseys, and so suggested a more precise dating, thereby siding with those scholars who “support” this as evidence of the famous earthquake of 365. Soren (1981) has reassessed the evidence provided by Jerome, whose *Life of St.Hilarion* was written fairly late (c.391). Jensen (1985) has pointed out that there was a seismic sea-wave in 365 (see entry < 154 >), and that there is therefore no reason to reject the date 365; and, finally, Soren *et al.* (1986) felt they could confirm this date on the basis of archaeological data (mostly evidence from the Kourion excavations: see Soren and Leonard 1989). But this is no more than speculation, based on coin finds, which at best can only provide a *terminus post quem* (cf. what Michaelidou-Nicolau 1985 has written on the subject. On the basis of coin finds, she has suggested that another earthquake occurred at Paphos roughly at the time of Hadrian (117-138), though it is not mentioned in any of the sources).

< 158 > before 374 • Reggio Calabria

inscriptions Putorti (1912); *AE* 1913, 227

literature Baratta (1936); Jacques and Bousquet (1984); Henry (1985); De Stefano (1987); Spadea (1987); *Catalogo epigrafi* (1989)

catalogues Guidoboni (1989)

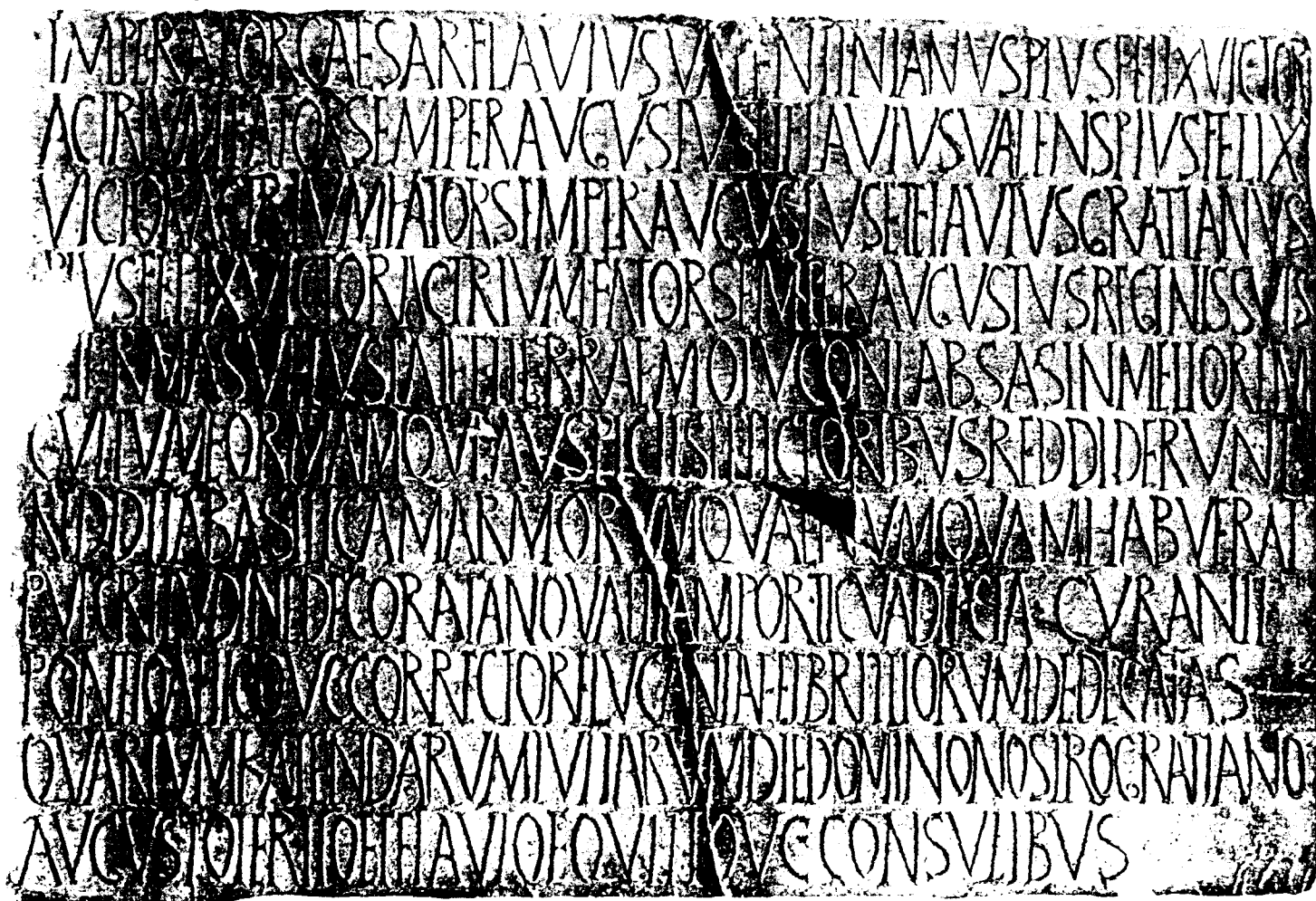
An inscription found at Reggio Calabria in 1912 records the rebuilding of the baths and nearby basilica in 374 AD. by the imperial family of Valentinian I, Valens and Gratian (Putorti 1912, pp.791-802; *AE* 1913, 227; Baratta 1936, p.13; *Catalogo epigrafi* 1989, pp.146-7): “The Emperor Caesar Flavius Valentinianus Pius Felix victor and in triumph always Augustus and Flavius Valens Pius Felix victor and in triumph always Augustus and Flavius Gratianus Pius Felix victor and in triumph always Augustus rebuilt for their people of Reggio the [b]aths which had been destroyed in an earthquake and by the passing of the years, renewing them with better auspices, in form and decoration, and they restored the basilica with splendid marble decoration such as it had [n]ever had before, and added a new portico, under the supervision of Pontius Atticus, an eminent senator, governor of Lucania and the Abruzzi. They were dedicated on the fourth day before the Calends of July (27 June), during the consulship of our lord Gratianus Augustus, for the third time, and the senator Flavius Equitius”.

Imperator Caesar Flavius Valentinianus Pius Felix victor / ac triumphator (sic) *semper Augustus et Flavius Valens Pius Felix / victor ac triumphator* (sic) *semper Augustus et Flavius Gratianus / Pius Felix victor ac triumphator* (sic) *semper Augustus Reginis suis / [t]hermas vetustate et terrae motu conlapsas in meliorem / cultum formamque auspiciis felicioribus reddiderunt / reddita basilica marmorum quae [n]umquam habuerat / pulcritudine* (sic) *decorata, nova etiam porticu adiecta, curante / Pontio Attico, v(iro) c(larissimo), correctore Lucaniae et Bruttiorum, dedecatas* (sic) */ quartum Kalendarum Iuliarum die, domino nostro Gratiano Augusto tertio et Flavio Equitio v(iro) c(larissimo) consulibus.*

The new buildings were inaugurated in 374, when Gratianus and Equitius were consuls. The earthquake mentioned in the inscription has been identified by Putorti (1912, pp.799-802) as that of 365 AD; in our opinion, however, there is no convincing evidence to justify this suggestion, and so we assume the collapse to have been the result of local seismic activity (see also recent archaeological evidence in Spadea 1987, pp.468-71).

Jacques and Bousquet (1984, p.424, note 7) have suggested — though very tentatively — that the earthquake should be dated to 362-364 AD. It is not impossible that this is the earthquake which struck Sicily during the reign of Julian, mentioned by Libanius

(see entry <149>). If that is so, there may have been one or more related earthquakes in eastern Sicily.



A marble plaque from Reggio Calabria. The text records the restoration, in 374 A.D., of baths which had been reduced to ruins "by the years and an earthquake" (Museo Nazionale, Reggio Calabria, photo Soprintendenza Archeologica della Calabria).

<159> shortly before 375 •Benevento

sources Symm. *Ep.* 1.4

literature Serva (1985); Molin and Serva (1985)

catalogues Baratta (1901); Carrozzo *et al.* (1973); Guidoboni (1989)

In one of his letters, Symmachus records that after an earthquake the people of Benevento tried hard to restore the city to its former beauty: "Embellishing the city with their own resources is a hard task. For after the earthquake they were left with practically nothing".

Privatam pecuniam pro civitatis ornatu certatim fatigant. Nam postquam terra movit, nihil paene illis reliqui factum est.

Earthquakes in the Benevento area tend to be destructive. Amongst better known modern cases are the earthquakes of 5 June 1688 (Serva 1985, pp.44-7), 14 March 1702 (Molin and Serva 1985, pp.54-5) and 17 September 1885 (Baratta 1901, p.502).

<160> **September–November 394 the Constantinople area?**

sources Marcell. Com. 64.6-7

catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Grumel (1958); Guidoboni (1989)

Marcellinus mentions an earthquake in Europe in very general terms: "From September to November, many regions of Europe were repeatedly shaken by an earthquake".

Terrae motu a mense Septembrio in Novembrium continuo imminente aliquantae Europa regione quassatae sunt.

He may perhaps be referring to Constantinople's Balkan hinterland.

<161> **396 Constantinople?**

sources 1 Oros. Hist. 3.3.1-2; Chron. Gall. a. 452; Marcell. Com. 64.32-3

sources 2 Glyc. 478-9

literature Hubaux (1954); Cameron (1987); Grattarola (1989)

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Capelle (1924); Downey (1955); Grumel (1958); Hermann (1962); Guidoboni (1989)

After mentioning the disaster at Helice and Bura in 373 B.C. (see entry <024>), Orosius reports an earthquake which occurred in his own day: "I, on the other hand, could now tell of similar things happening in our own day at Constantinople, a city equal in greatness to Rome; for they were predicted and actually occurred, but without the disastrous consequences that might have been expected. For after a dire warning and revelation of disaster to come, the earth shook to its foundations, and flames filled the sky and hung over the city; but then God heard the prayers of the emperor Arcadius and the Christian people, and averted the imminent disaster".

At ego nunc e contrario poteram similia in diebus nostris apud Constantinopolim, aequo modo principem gentium, praedicta et facta sed non perfecta narrare, cum post terribilem denuntiationem conscientiamque mali sua praesciam subter commota funditus terra tremere et desuper fusa caelitus flamma penderet, donec orationibus Arcadii principis et populi Christiani praesentem perditionem Deus exoratus averteret.

It is not clear whether Orosius is referring to the earthquake of 396 or of 402 (see entry <163>), or even that of 407 (see entry <165>). Marcellinus records that in the fourth year of the reign of Arcadius and the third of Honorius: "There was an earthquake for a number of days, and the sky seemed to be on fire".

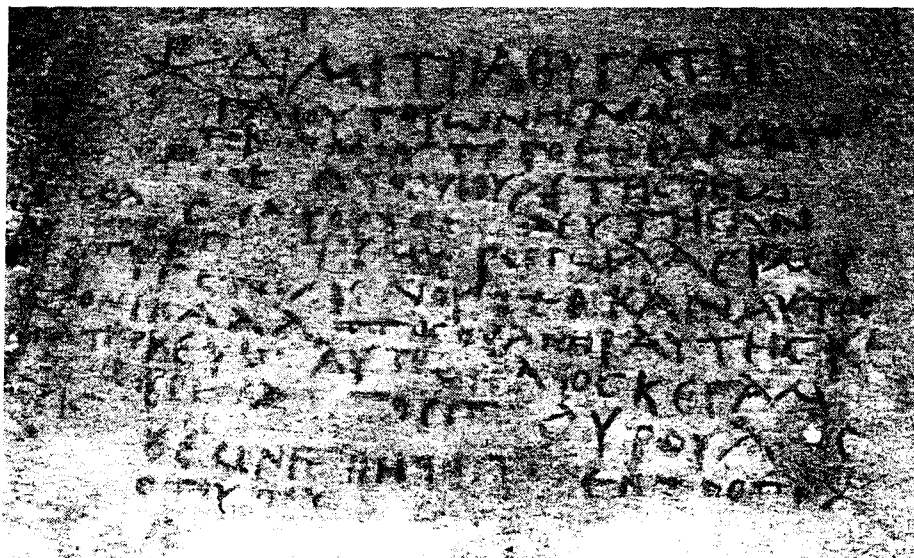
Terrae motus per dies plurimos fuit caelumque ardere visum est.

The *Gallic Chronicle* of 452 also refers to a column of fire in the sky, but relates it to the year 395: "Constantinople repented whole-heartedly of its sins, and so escaped the wrath of God in the form of fire which rose up above the clouds with terrifying brightness".

Constantinopolis eminentem dei iram ignem super nube(m) terribiliter fulgente(m) toto ad penitentiam animo conversa subterfugit.

According to Cameron (1987), these sources are referring to an earthquake in 396; and without supporting his hypothesis with any scientific argument, he suggests that the fire seen in the sky was volcanic. In his view, the tremors may also be related to a volcanic eruption.

Earthquakes in this period seem to have struck the sensitivity of many writers, with some consequent misunderstandings. For example, Gregory of Nyssa, in his *Funeral Oration for Pulcheria* (daughter of Theodosius I; she died in 385/6), refers three times to an earthquake tremor which apparently occurred at the time of her death (Greg. Nyss. *Pulcher.* 461.8; 462.24; 463.1; *Placill.* 481). He claims that a similar tremor occurred when her mother, Flaccilla, died shortly afterwards. Cameron (1987, p.352) rejects this evidence as being no more than a literary *topos*.



Necropolis of Cyrene (Libya). Tomb of Demeter: Painted Christian Greek inscription recording the death of a mother and her son in an earthquake in the late 4th century (photo L.Bacchielli).

<162> **end of the 4th century** ●Cyrene, ●Hydrax

sources Synes. 42.71.1, 61.11.16

inscriptions Comparetti (1914)

literature Roques (1987); Henry (1985)

catalogues Guidoboni (1989)

There is a painted Greek Christian inscription, found in the necropolis at Cyrene, which reads: "Demetra, daughter of the landowner Gaius. She lies here with (?) this tomb, [buried?] after her son Theodulus. They died in the fields at Myropola, as the result of an earthquake [...]".

Διμητρία θυγατηρ / Γαίου τοῦ ὠνησαμένου / τὸ μνημῖον τῦτο ἐνθάδε κῖτε / μετὰ τοῦ υἱοῦ αὐτῆς Θεωδούλου. οὗτοι ἐτελεύτησαν / ἐπὶ ἀγροῦ Μυροπωλᾶ σισμοῦ / γενομένου [...].

The inscription has subsequently been slightly altered, with additions in the left-hand margin, in a way which is not altogether clear. It was published by Comparetti (1914), who suggested a dating to 394, but in fact there seems to be insufficient evidence to make dating possible. We know of two *epistolae* by Synesius of Cyrene written in early 412, in which he says that earthquake damage could still be seen in Cyrenaica, though the date of the earthquakes is unclear. In *Epistola* 42, which includes the decree of excommunication of the magistrate Andronicus, he says that the latter is as great a scourge as those which had already struck the Pentapolis: an earthquake, locusts, famine and war. In *Epistola* 61, on the other hand, he says that the fortress of Hydrax had been "destroyed by an earthquake sent by the divine will, which reduced it to ruins".

κατασείσαντος δὲ τοῦ θεοῦ γέγονεν ἐκλειλεμμένον ἐρείπιον.

Roques (1987, pp.45-52) reviews the sources and tries to relate all their evidence to the earthquake of 365, but without producing really convincing evidence to that effect.

<163> **402 Constantinople**

- sources** Synes. *ep.* 61; Ioh. Chrys. *hom.* 7, PG 60.66; *hom.* 41, PG 60.291; Claudian. in Eutr. 2.24-45; Philostorg. *HE* 11.7; Marcell. *Com.* 67.13-4
- literature** Seeck (1894, 1913); Henry (1985); Barnes (1986); Cameron (1987); Roques (1989)
- catalogues** Bonito (1691); von Hoff (1840); Downey (1955); Grumel (1958); Hermann (1962); Guidoboni (1989)

According to Marcellinus, the earthquake occurred in 402: "There was a great earthquake at Constantinople".

Constantinopolim [sic] ingens terrae motus fuit.

This may be the same earthquake as the one mentioned in *Epistola 61* by Synesius of Cyrene. At the end of his embassy to Constantinople in 402, he wrote: "God often caused tremors to occur by day, and most men, with bowed heads, devoted themselves to prayer; the earth's surface did indeed shake".

Ἔσειεν ὁ θεὸς τῆς ἡμέρας πολλάκις, καὶ πρὸς ἱκετηρίας ἦσαν οἱ ἄνθρωποι πρηνεῖς οἱ πλείους· τὸ γὰρ ἔδαφος ἐκκραδαίνετο.

Grumel (1958, p.477) dates the earthquake to June 402. There has recently been a debate about the dating, and other sources have been taken into consideration, but they are more difficult to date. One interesting piece of evidence, in spite of its vagueness, is in Homilies 7 and 41 *On the Acts of the Apostles* by John Chrysostom, where he invites the faithful to remember the earthquake which had struck them. In Homily 41 he also seems to suggest that an earthquake had occurred the year before, by asking the rhetorical question: "Did not God last year shake our whole city?"

οὐ πέρυσιν ἐτίναξεν ὁ Θεὸς τὴν πόλιν πᾶσαν.

The matter was brought up as part of the explanation of how the people had relapsed into their "normal" way of life only three days after temporarily abandoning their sinful ways. In his *Ecclesiastical History*, Philostorgius also makes a vague reference to earthquakes occurring along with other prodigies in Europe, Asia and Africa.

The poet Claudian, too, speaks of a "tremor" striking Chalcedon and disturbing the sea at the Bosphorus; but this must surely be a literary *topos*, and must also be dated to January 399, since the disasters concerned were supposed to have happened during the consulship of Eutropius, who is the butt of Claudian's invective: "Ere yet he had donned the consul's robe there came a rumbling from the bowels of the earth; a hidden madness shook the subterranean caverns and buildings crashed one on another. Chalcedon, shaken to its foundations, tottered like a drunken man, and Bosphorus, straying from his course, flooded the cities on his either bank".

Induerat necdum trabeas: mugitus ab axe / redditus inferno, rabies arcana cavernas / vibrat et alterno conflagunt culmine lapsu. / bacchatus per operta tremor Calchedona movit / pronus et in gematus nutavit Bosphorus urbes.

Seeck (1894) — from whom Downey (1955, p.597) and Hermann (1962, col.1107) derive their information — relates the evidence provided by John Chrysostom to the earthquake of 402 recorded by Marcellinus; and in a later study (1913, pp.305 and 563), Seeck expresses the opinion that Claudian and Philostorgius were alluding to a different earthquake, which occurred at Constantinople in 398.

Barnes (1986) has shown that, given the context of the remarks of Synesius (he mentions the consulship of Aurelianus), the earthquake of 402 might be datable to 400; and Cameron (1987) took up this argument. In his view, the allusions to an earthquake in John Chrysostom's Homilies 7 and 41 can also be dated to 400, his argument being based on a series of clues deriving solely from literary sources. Cameron also

takes into consideration the tradition surrounding the earthquake of 396 (see entry < 161 >), and concludes that there were in fact two earthquakes: one in 396 and the other in 400. According to Cameron, the earthquake of 398, suggested by Seeck, and that of 402, are to be rejected.

However, Cameron's ingenious reconstruction is less than perfect. If we wished to associate Claudian's evidence with the year 400, we would have to reject that of Synesius, who put to sea after the earthquake, since the sea was safer than the land. Since Claudian mentions a seismic sea-wave, the two passages may not be referring to the same occurrence. But even if we assume that Claudian's lines are no more than a literary *topos*, there is no chronological way in which we could account for his having shifted the earthquake to a different year.

Roques (1989, p.19, note 26) points out that the passages from John Chrysostom used by Cameron involve too many dating problems to permit firm conclusions to be drawn: *Homily 41* could itself be dated to 402.

It is difficult to date the earthquake mentioned by Orosius. We have attributed it to 396 (see entry < 161 >), but it could equally well be this or even a later one.

We feel that historians and textual scholars should proceed with greater caution. The period concerned presents too many problems of interpretation for satisfactory conclusions to be reached. The language of the times was such that earthquake tremors described as "terrible" or "terrifying" were not necessarily destructive, and it was fairly easy for a historian or writer of apologetics to conflate or confuse his sources.

There are various other allusions to earthquakes in the writings of John Chrysostom (see Henry 1985 and Cameron 1987), but unfortunately they cannot all be dated. For example, it is difficult to date what is known as the *Homily after the Earthquake* (pg 50.713-6), or *Homily vi on Lazarus* (pg 48.1027-44), and in any case they do not provide what can be taken as observational data on occurrences, nor do they seem to refer to recent destructive earthquakes.

< 164 > **a night in 403 Constantinople**

sources 1 Theodor. *HE* 5.34

sources 2 *Synax. Arm. PO* 6.218 and 234

literature Demougeot (1951); Stiernon (1965); Roques (1989)

catalogues Bonito (1691); Mallet (1853); Downey (1955); Grumel (1958); Guidoboni (1989)

Theodoret records an earthquake at Constantinople which probably only caused alarm: "At night a great earthquake took place, and the empress was extremely frightened. At the earliest break of day messengers were sent to where [St. John Chrysostom] was in exile, entreating him to return to the city as rapidly as possible, and save it from impending danger".

Σεισμοῦ δὲ μεγίστου νύκτωρ γεγεννημένου καὶ δέϊματος τὴν βασιλίδαν κατεσχηκότος, πρέσβεις ὑπὸ τὴν ἑω πρὸς τὸν ἐληλαμένον ἀπεστάλησαν, ἀντιβολοῦντες ὡς τάχιστα τὸ ἄστυ καταλαβεῖν καὶ στήσαι τῇ πόλει τὸν κίνδυνον.

The hagiographical tradition also records earthquakes and hail for this period, and interprets them as signs of God's disapproval of the exiling of John Chrysostom by the empress Eudoxia: see Demougeot's chronology (1951, p.322) and Stiernon (1965, p.681).

The association between John Chrysostom and earthquakes must have appealed to the popular imagination. The *Armenian Synaxarium* also records that Eudoxia's tomb in Constantinople shook for 33 years [from 405 to 438], until the remains of St. John Chrysostom, who had died in Armenia Minor, were brought back to the city.

Roques (1989) thinks this is the earthquake of 402 (see entry < 163 >), but he does not support his hypothesis with any argument.

<165> **the night of 1 April 407 •Constantinople** >seismic sea-wave<

sources Nyl. Ancy. *epist.* 2.265; *Chron. Pasch.* 570

catalogues Bonito (1691); Mallet (1853); Capelle (1924); Downey (1955); Grumel (1958); Hermann (1962); Guidoboni (1989)

A destructive earthquake at Constantinople is recorded in the *Chronicon Paschale*: "And in this year [407] there was great rain with thunder and earthquake in the month of Xanthicus, on the Calends of April [1 April] in the first watch of the night. As a result the bronze tiles of the Forum of Theodosius were swept away to Cainoupolis, and Christ's emblem and a considerable number of corpses were cast ashore at the Hebdomon".

Καὶ αὐτῷ τῷ ἔτει ἐγένετο βροχὴ μεγάλη σὺν βρονταῖς καὶ ἀστραπαῖς καὶ σεισμῷ μηνὶ ξαντικῷ καλανδαῖς ἀπριλίαις πρωθυπνίῳ, ὥστε ἀνασκευασθῆναι τὰς κεράμους τὰς χαλκὰς τοῦ φόρου Θεοδοσίου ἐπὶ Καινούπολιν καὶ τὸ σιγνόχριστον τοῦ Καπετωλίου πεσεῖν καὶ πολλὰ πλοῖα παθεῖν καὶ ἐκριφῆναι σκηνώματα οὐκ ὀλίγα ἐν τῷ Ἑβδόμῳ.

Cainoupolis means the area by the Sea of Marmara to the south east of the Forum of Theodosius and to the east of the port of Theodosius. There may be a reference to this earthquake in an *epistola* by Nilus of Ancyra, who was replying to a letter from the emperor Arcadius, in which a religious opinion on the earthquake was sought. This may be the same earthquake as that mentioned by Orosius which we have dated to 396 (see entry <161>). In fact it is not attributable to any date with certainty.

<166> **408 Rome**

sources 1 Marcell. Com. 69.22-3

sources 2 Theoph. 124; *Exc. Sangall.* 19

inscriptions *CIL* 6.1676

literature Lanciani (1897); Marchetti Longhi (1922); Guarducci (1969-70); Coarelli (1981); Manacorda (1982); Panciera (1982); *Catalogo epigrafi* (1989)

catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Baratta (1892); Galli (1906); Grumel (1958); Guidoboni (1989); Alexandre (1990)

The *Chronicle* of Marcellinus states: "In the Forum Pacis in Rome, the earth rumbled for seven days".

Romae in foro Pacis per dies septem terra mugitum dedit.

The phrase *mugitus terrae* (a rumbling of the earth) is often used to describe the noise made by an earthquake, but sources sometimes record a *mugitus* without specifying a seismic origin. This hypothetical earthquake has been linked by some scholars to the rebuilding of a *schola*, which already existed in the third century AD. The new building was to be near the *porticus Minucia Frumentaria* (Guarducci 1969-70, p.228; Coarelli 1981, pp.25, 48). We are now, however, in an area of very vague hypotheses. We cannot even completely exclude the possibility that the noise had a purely symbolic value, in view of the fact that it was heard in the Forum Pacis in the very year when Alaric's Visigoths invaded Italy for the second time.

An inscription from Rome, dating to 421-423 but now no longer in existence (*CIL* 6.1676), has been linked to this earthquake (*Catalogo epigrafi* (1989, pp.150-1): "[Given the safety of] Our Lords and eternal Princes Honori[us and Theodosius (our two) Aug(usti)], Anicius Acilius Glabrio Faustus, an illustrious senator and praefectus ur[bi, restored] to its original form and use the [---] which was destroyed as a result of an event brought about by fate".

395] rather than Theodosius II [408-450], suggesting that it was the one recorded by Cedrenus (550-1) as having occurred during the reign of Gratian [375-383]. According to Di Vita (1979-80 [but 1986], p.439), the damage to the baths at Gortyna was caused by the 365 AD. earthquake (see entry < 154 >). He relies largely on coin finds, and hence on establishing a *terminus post quem*, and plays down the evidence provided by Malalas, pointing out that he often makes mistakes, and implicitly suggesting that the baths were restored by Theodosius I and not by Theodosius II. But Malalas specifically asserts that the earthquake occurred “under Theodosius”. Therefore, if the record of Malalas is accepted, the damage to the baths of Gortyna will be dated to after 365. (For the damage to the Praetorium, see p.272).

< 168 > 5 July 409 Constantinople

sources *Chron. Pasch.* 570
literature Whitby and Whitby (1989)

The only source to mention this earthquake is the *Chronicon Paschale*: “And in the same year [408] there was great rain with thunder and lightning and an earthquake in the month of Panemus, on the third day before the Nones of July [5 July], a Monday, at the first hour”.

καὶ αὐτῷ τῷ ἔτει ἐγένετο βροχὴ μεγάλη σὺν βρονταῖς καὶ ἀστραπαῖς καὶ σεισμῷ μηνὶ πανέμῳ πρὸ γ' νωνῶν ἰουλίῳν ἡμέρᾳ δευτέρᾳ ὥρα α'.

Whitby and Whitby (1989, p.61) have pointed out that, chronologically speaking, the date 5 July would be correct for 409. The fact that the earthquake is not mentioned by other writers suggests that it was a minor one, and that the *Chronicon Paschale* mentions it only because of its value as a prodigy.

< 169 > 417 •Cibyra

sources Marcell. Com. 73.14-6
catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Downey (1955); Grumel (1958); Hermann (1962); Guidoboni (1989)

Marcellinus writes: “It became dark in the daytime. Cibyra, a city in Asia, and some farmland were swallowed up by an earthquake”.

Tenebrae in die factae sunt. Cibyra Asiae civitas aliquantaeque praedia terrae motu demersa.

< 170 > the evening of 20 April 417 Constantinople?

sources *Chron. Pasch.* 572
catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Downey (1955); Grumel (1958); Hermann (1962); Guidoboni (1989)

The *Chronicon Paschale* records this earthquake with a wealth of chronological detail: “Indiction 15, year 9, the 11th consulship of Honorius and the 2nd of Constantius. In the time of these consuls there occurred a great earthquake in the evening, on a Friday in the month of Xanthicus, on the twelfth day before the Calends of May [20 April]. It was on the same day as the Passion of our Lord Jesus Christ”.

Ἰνδ. ιε'. θ'. ὑπ. Ὁνωρίου τὸ ια' καὶ Κωνσταντίου τὸ β'. ἐπὶ τούτων τῶν ὑπάτων σεισμὸς ἐγένετο μέγας ἑσπέρας ἡμέρᾳ παρασκευῇ μηνὶ Ξαντικῷ πρὸ ιβ' καλανδῶν μαΐων. ἦν δὲ κατ' αὐτὴν τὴν ἡμέραν τὸ πάθος τοῦ Κυρίου ἡμῶν Ἰησοῦ Χριστοῦ.

Catalogues also place the earthquake at Constantinople, on the grounds that it was normal for Byzantine chroniclers not to mention where an earthquake occurred if it was at Constantinople. However, Malalas (363) says that the first earthquake at Constantinople in the reign of Theodosius II was that of 26 January 447. But Malalas writes of "divine wrath" rather than σεισμός, and hence may well not have bothered to mention minor earthquakes (see entry < 174 >). The fact remains, nevertheless, that the *Chronicon Paschale* describes this earthquake as "great".

For lack of other evidence, we may conclude that there may have been a strong but not destructive earthquake at Constantinople, and it may have nothing to do with the more serious earthquake which struck Cibra. The *Chronicon Paschale* probably pays some attention to the earthquake because it occurred on Good Friday.

< 171 > 419 Jerusalem, ●Palestine

- sources Aug. *Serm.* 19.6; *Cons. Constant.* a. 419; Hydat. *Chron.* 66 (= 71a Tranoy); Marcell. *Com.* 74.8-9
 literature Russell (1985)
 catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Sieberg (1932 a); Amiran (1950-51); Grumel (1958); Hermann (1962); Ben-Menahem (1979); Guidoboni (1989)

In his *Sermons*, Augustine mentions various earthquakes in Palestine as a result of which thousands of people were baptised: "Great earthquakes are reported from the East. Some great cities suddenly collapsed in ruins. Jews, pagans and catechumens in Jerusalem were terrified, and all were baptised. It is said that perhaps as many as seven thousand people were baptised. The sign of Christ appeared on the clothes of baptised Jews. These things were told in a thoroughly reliable report by our brothers in the faith".

Terrae motus magni de orientalibus nuntiantur. Nonnullae magnae repentinis conlapsae sunt civitates. Territi apud Hierosolymam qui inerant iudaei, pagani, catechumini, omnes sunt baptizati. Dicuntur fortasse baptizati septem millia hominum. Signum Christi in vestibus iudaeorum baptizatorum apparuit. Relatu fratrum fidelium constantissimo ista nuntiantur.

According to Marcellinus: "Many towns and villages in Palestine were reduced to ruins in an earthquake".

Multae Palaestinae civitates villaeque terrae motu conlapsae.

Hydatius reports: "During the episcopacy mentioned above, the Holy Places of Jerusalem and other areas were shaken by a very severe earthquake".

Durante episcopo quo supra, gravissimo terrae motu sancta in Hierosolymis loca quasantur et cetera.

The manuscripts place Hydatius' entry under the year 418, but as A. Tranoy, the editor of the text, has shown, the scribe seems to have confused a mention of bishop John of Jerusalem (who was already dead by this time) with one of bishop Eulalius of Rome, who is referred to in paragraph 66 of the *Chronicle*. Tranoy dates the earthquake to 419 on the basis of evidence from Marcellinus and the *Consularia Constantinopolitana*. For archaeologists' identification of sites where the earthquake struck, see Russell (1985, pp.42-3).

< 172 > 419 Sitifis

- sources Aug. *Serm.* 19.6
 literature Lepelley (1984 a)
 catalogues Guidoboni (1989)

In his *Sermons*, Augustine mentions an earthquake on the north African coast: "The city of Sitifis was also shaken by an earthquake so violent that everyone stayed out in the open fields for five days, and it is said that about two thousand people were baptised there".

Sitifensis etiam civitas gravissimo terrae motu concussa est, ut omnes forte quinque diebus in agris manerent, et ibi baptizata dicuntur fere duo milia hominum.

<173> 422 Constantinople?

sources 1 *Chron. Pasch.* 313

catalogues Mallet (1853); Grumel (1958); Hermann (1962); Guidoboni (1989)

According to the *Chronicon Paschale*, during the thirteenth consulship of Orosius and the tenth of Theodosius, in the fifth indiction, "an earthquake occurred".

Καὶ αὐτῷ τῷ ἔτει ἐγένετο σεισμός.

Grumel (1958, p.477) does not give a location for the earthquake. Hermann (1962, col.1108) places it at Constantinople. This is very likely, even though Malalas (363) claims that the first earthquake at Constantinople during the reign of Theodosius II occurred on 26 January [447]. This is not in fact a contradiction, for Malalas is only interested in recording large destructive earthquakes (see entry <174>). The *Chronicon Paschale*, on the other hand, also records some smaller seismic events, at least when they are of some importance for the religious life of Constantinople.

<174> the afternoon of 7 April 423 Constantinople?

sources 1 Marcell. Com. 76.4; *Chron. Pasch.* 313

sources 2 Mich. Syr. 2.22

catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Capelle (1924); Downey (1955); Grumel (1958); Hermann (1962); Guidoboni (1989)

Marcellinus records: "There was an earthquake in many places, followed by a dearth of crops".

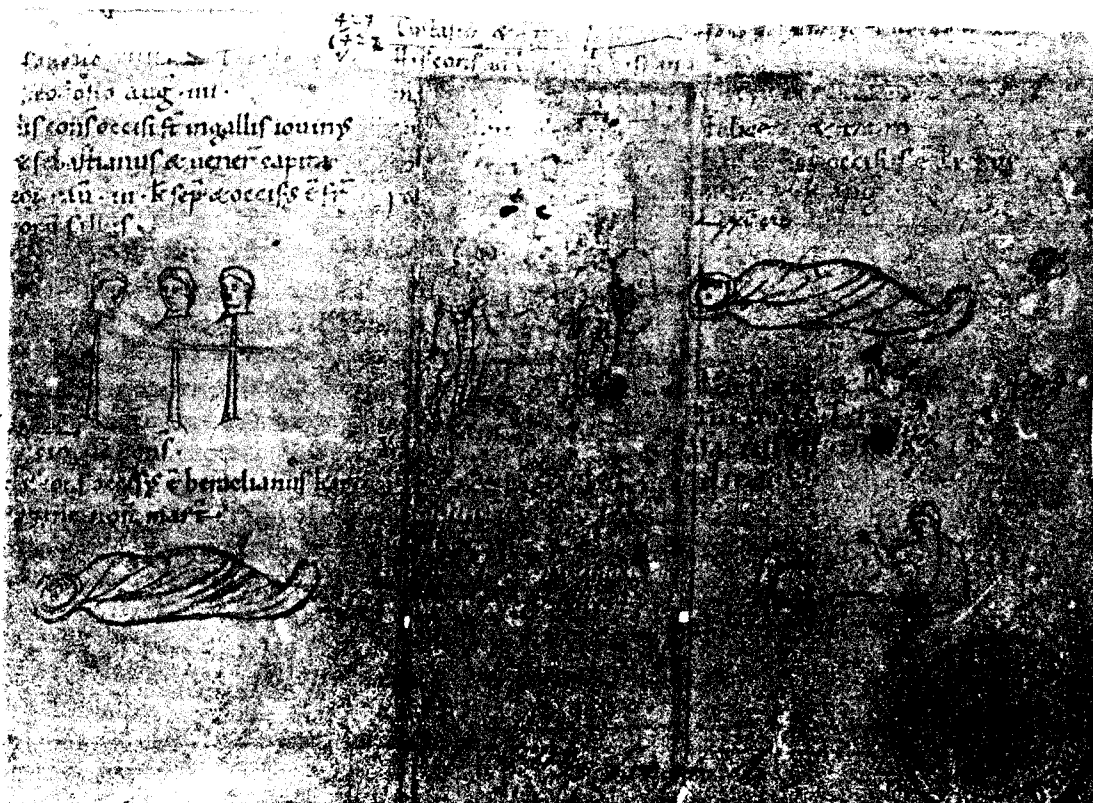
Terrae motus multis in locis fuit et frugum inedia subsecuta.

The *Chronicon Paschale* records many earthquake tremors on 7 April in the sixth indiction during the consulship of Asclepiodotus and Marinianus [423]: "[...] and there were many earthquakes on Monday during the tenth hour in the month of Xanthicus, on the seventh day before the Ides of April [7 April]".

Καὶ πολλοὶ σεισμοὶ ἐγένοντο ἡμέρα δευτέρα ὥραν δεκάτην μηνὶ ξανθικῷ πρὸ ζ' ἰδῶν ἀπριλίων.

Grumel (1958, p.477) does not give a location for the earthquake. Downey (1955, p.597) and Hermann (1962, coll.1108) suggest that it was probably at Constantinople. See also Capelle (1924, col.347). The suggested location clashes with Malalas' claim (363) that the first earthquake at Constantinople during the reign of Theodosius II occurred on 26 January [447]. However, there seems to be no doubt that an earthquake did indeed occur on 25 September 437; and yet Malalas does not record it. A solution to this problem may perhaps be found in the suggestion that the phrase used by Malalas ("the city was struck by the wrath of God") was intended as a reference to destructive rather than minor earthquakes. Thus Marcellinus does not dwell on the earthquake, or even bother to date it, while the *Chronicon Paschale* seems to be recording a series of small tremors.

This small drawing from a fragment of the *Annales Ravennates* shows a dragon attached to a human form, and appears twice: alongside the report of the earthquake of 429 and that of 443 (see p.291). According to Bischoff and Koehler (1939) the dragon may represent a chthonian deity from the Anatolia-Phrygia region, as redrawn by a 9th century copyist who probably did not understand the meaning of the drawing (Archiv und Bibliothek des Domstifts, Merseburg).



〈 175 〉 25 August 429 Ravenna

sources 1 *Ann. Rav.* 128

sources 2 *Exc. Sangall.* 20

literature Bischoff and Koehler (1939, 1952); Guidoboni (1989 a)

catalogues Guidoboni (1989); Alexandre (1990)

The *Annales Ravennates* (Bischoff and Koehler 1939, p.128) mention an earthquake at Ravenna and give it a precise date: "There was an earthquake on the eighth day before the Calends of September [25 August 429], the day of the sun, when Florentius and Dionysius were consuls".

Florentio et Dionisio His consulibus terre motus factus est viii kal. Sep. die Solis.

The manuscript text is accompanied by a small illustration showing an animal and a man to represent the earthquake (see the remarks in Bischoff and Koehler 1939, and Guidoboni, 1989 a, p.335).

The earthquake is also mentioned in the *Excerpta Sangallensia*, but the date is given as 1 September.

〈 176 〉 25 September 437 Constantinople

sources 1 Theoph. 93

sources 2 *Narr. de reb. Arm.* 18; Ps. Codin. *Patr. Constant.* 1.72; *Synax. Eccl. Const.*, 25 September; Niceph. 14.4.5

literature Dölger (1956)

catalogues Bonito (1691); Downey (1955); Grumel (1958); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

Although various religious works refer to this earthquake, the only source to supply a date and location is the Chronography of Theophanes (8th century). Although a late work, it is an important and reliable source, especially for events in Constantinople. Theophanes writes: "When that Proclus who is numbered amongst the saints was

patriarch, there were such great earthquakes at Constantinople for four months that the Byzantines fled from the city”.

ἐπὶ τούτου τοῦ ἐν ἀγίοις Πρόκλου σεισμοὶ γεγόνασι μεγάλοι ἐν Κωνσταντινούπολει ἐπὶ τέσσαρας μῆνας, ὥστε φοβηθέντες οἱ Βυζάντιοι ἔφυγον ἔξω τοῦ πόλεως.

Ecclesiastical literature paid particular attention to this earthquake, because it involved the story of the hymn called *Trisagion*. For, as Theophanes and many other writers record, the earthquake apparently ceased after the words “Holy God, Almighty God, Immortal God, have mercy on us” were pronounced. These words had apparently been revealed to St. Proclus, who was then patriarch of Constantinople, by a boy who came down from heaven. After the mid-fifth century, this hymn acquired great importance in the eastern liturgy. The Synaxarium of Constantinople simply calls this seismic event a “great earthquake” (μέγας σεισμός), and dates it to 25 September of the thirtieth year of the reign of Theodosius and the year of the world 5930 [September 437–August 438].

〈177〉 17 April 442 Constantinople?

sources Theoph. 96

catalogues Downey (1955); Grumel (1958); Hermann (1962); Guidoboni (1989)

The only evidence for this earthquake is to be found in the Chronography of Theophanes (8th century). Although a late work, it is an important and reliable source, especially for events in Constantinople. Theophanes dates this earthquake to the year of the world 5934 [442], but does not give an exact location: “In this year the earth was shaken and made to tremble fifteen days before the Calends of May [17 April]”.

Τούτω τῷ ἔτει ἐσειέσθη ἡ γῆ καὶ ἐμυκήθη πρὸς ἑκατὸν καλανδῶν ματίων.

According to Downey (1955, p.597) the earthquake can be presumed to have occurred at Constantinople.

〈178〉 443 ●Rome

sources 1 *Fasti Vind. Post.* 301

sources 2 *Exc. Sangall.* 20; Paul. Diac. *Hist. Rom.* 13.16; Land. *Sagax Hist. Rom.* 1.367

inscriptions *CIL* 6.1763 = 6.32089 = *ILS* 5633; *CIL* 6.32085-32087, to which Chastagnol made additions (1966); *ICUR*² 4783

literature Lanciani (1918); Lugli (1952-60); Bischoff and Koehler (1939); Krautheimer *et al.* (1980); *Catalogo epigrafi* (1989); Molin and Guidoboni (1989)

catalogues Filippo da Secinara (1652); Bonito (1691); Perrey (1848); Mallet (1853); Mercalli (1883); Baratta (1892, 1899, 1901); Galli (1906); Grumel (1958); Carrozzo *et al.* (1973); Guidoboni (1989); Alexandre (1990)

At the year 443 in the *Fasti Vindobonenses Posteriores*, we read: “During the consulship of Maximus and Paterius, Rome was struck by an earthquake, and statues and the new porticoes collapsed”.

Maximo et Paterio his consulibus terrae motus factus est Romae et ceciderunt statuae et portica nova.

It is impossible to identify the “new porticoes” which are mentioned as having been damaged. Lanciani (1918) thought they were the two parts of the portico at the Theatre of Pompey which Diocletian and Maximianus had restored, and which from

then onwards were called *Iovia e Herculia* in honour of those gods.

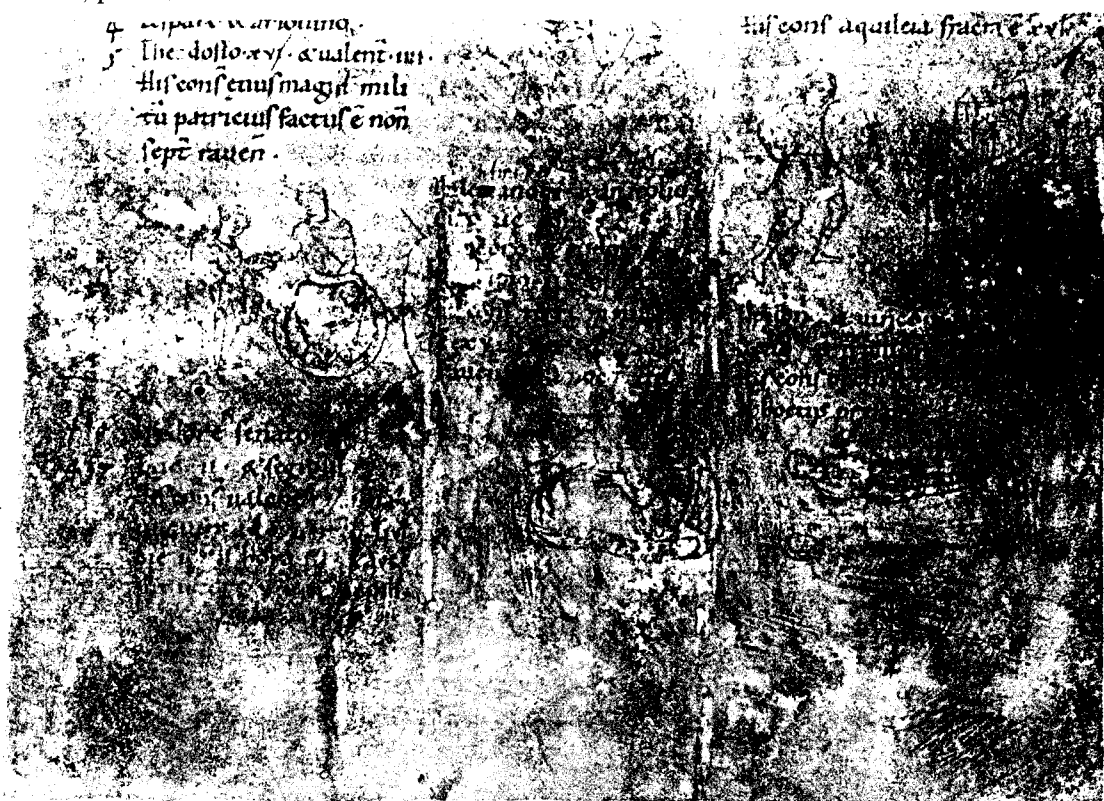
Paul the Deacon also refers to this earthquake in his *Historia Romana*: "At about this time, Rome was so shaken by a violent earthquake that the most important houses and other buildings collapsed".

Sub his fere diebus tam terribili Roma terremotu concussa est, ut primae eius aedes aedificiaque corruerint.

The earthquake in Rome mentioned by Paul the Deacon is dated to after 442 by Lugli (1952-60, v, p.128).

The *Annales Ravennates* (Bischoff and Koehler 1939, 1952) mention an earthquake at Ravenna in 443, but make no reference to Rome. It is likely that the *Fasti Vindobonenses* are relying on an unknown source which was also used by Paul the Deacon. It is always conceivable that an earthquake in the central Apennines caused damage in Rome and was also felt in Ravenna. For lack of more convincing evidence to connect the two, the Rome and Ravenna earthquakes have been treated separately. There is probably a connection between this earthquake and restoration work in the Colosseum referred to in *CIL* 6.1763 = 32089 = *ILS* 5633, and *CIL* 6.32085-32087, as added to by Chastagnol (1966, pp.64-5, nos.1-28). For text and bibliographical references, see *Catalogo epigrafi* (1989, pp.152-4).

Some scholars have blamed this earthquake for the collapse of part of the church of San Paolo fuori le mura as recorded in *ICUR*² 4783, which dates to the pontificate of Leo I (440-461). Krautheimer *et al.* (1980, pp.161 and 166), however, think that the collapse of the church roof was caused by lightning, as stated in the *Liber Pontificalis* (I, p.239; see *Catalogo epigrafi* 1989, p.154).



A fragment of the
Annales Ravennates (see p.289).

〈179〉 the night of 15 April 443, c.1 a.m. Ravenna

sources 1 *Ann. Rav.* 129

literature Bischoff and Koehler (1939, 1952); Guidoboni (1989 a)

catalogues Guidoboni (1989)

The *Annales Ravennates* are very precise as to date and time in recording an earthquake tremor at Ravenna: "During the consulship of Maximus II and Paterius, there was an earthquake at Ravenna on the seventeenth day before the Calends of May [15 April 443], a Thursday, at the eighth hour of the night [c.1 a.m.]".

Maximo II et Paterio His consulibus terrae motus factus est xviii kal. Mai. die Iovis Ravennae hora noctis viii.

The date of the earthquake has been corrected from xv kal. Mai. [17 April] to xvii kal. Mai. [15 April] because 17 April was not a Thursday but a Saturday (Bischoff and Koehler 1939, 1952). Beside this piece of text is an identical figure to the one beside the earthquake of 429. See entry (175) and Guidoboni (1989 a, p.336).

(180) **the night of 26 January 447 •Constantinople, •Nicomedia, •Bithynia, •the Hellespont, •Phrygia**
▷seismic sea-wave, subsidence◁

- sources 1 Marcell. Com. 82.9-19, 24-7; Mal. 363-4; Evagr. 1.17; *Chron. Pasch.* 586, 589; Theoph. 93
- sources 2 *Fragm. Tuscul.* 3.17-8; Cedren. 599-600; Glyc. 260; Niceph. Call. 14.46
- literature Unger (1878); Follieri (1966); Dagron (1974); Croke (1981); Dagron (1984); Palumbo (1989 b); Zecchini (1989)
- catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Capelle (1924); Downey (1955); Grumel (1958); Hermann (1962); Ambraseys (1962 b); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

This earthquake also had substantial seismic sea-wave effects, and is given various dates and locations in the sources.

Marcellinus (82.9-19) records that there was a massive earthquake during the consulship of Ardabur and Calypsius [447], and he lists damage to various buildings in Constantinople: "A great earthquake struck various places, and many recently rebuilt walls of the great city collapsed, together with fifty-seven towers. In addition, some huge blocks of stone placed high up in a building in the Forum Tauri, and a number of statues, collapsed, though they were not in any way defective, and indeed many cities were reduced to ruins. Starvation and a noxious smell in the air killed many thousands of people and cattle".

Ingenti terrae motu per loca varia imminente plurimi urbis augustae muri recenti adhuc reaedificatione constructi cum quinquaginta septem turribus corruerunt. saxa quoque ingentia in foro Tauri dudum super sese in aedificio posita statuaeque plurimae sine ullius videlicet laesione conlapsae sunt, plurimis nihilominus civitatibus conlapsis: fames et aerum pestifer odor multa milia hominum iumentorumque delevit.

Marcellinus adds (82.24-7): "In that same year [447], when he was praetorian prefect, Constantinus was responsible for seeing that the walls of that great city [Constantinople], which had collapsed some time earlier in an earthquake, were rebuilt in three months".

Eodem anno urbis augustae muri olim terrae motu conlapsi intra tres menses Constantino praefecto praetorio operam dante reaedificati sunt.

Evagrius agrees as to the severity of the earthquake, and describes certain other effects, extending the area of damage to Bithynia, the Hellespont and Phrygia: "It was also in the reign of Theodosius that an extraordinary earthquake occurred, which threw all former ones into the shade, and extended, so to speak, to the whole world. Such was its violence, that many of the towers in different parts of the imperial city

were knocked down, and the long wall, as it is called, of the Chersonese, was reduced to ruins; the earth opened and swallowed up many villages; and innumerable other calamities happened both by land and sea. Several fountains became dry, and, on the other hand, large areas of water formed on the surface, where none had existed before: entire trees were torn up by the roots and hurled into the air, and mountains were suddenly formed by the accumulation of masses thrown up. The sea also cast up dead fish; many islands were submerged; and, again, ships were seen stranded by the retreat of the waters. At the same time Bithynia, the Hellespont, and both Phrygias suffered severely. This calamity lasted for a considerable time, though its original violence did not persist, but abated by degrees until it entirely ceased”.

Τοῦ αὐτοῦ τοίνυν Θεοδοσίου τὰ σχῆπτρα διέποντος, μέγιστος καὶ ἐξαίσιος καὶ τοὺς προλαβόντας ἅπαντας ἀποκρυπτόμενος γέγονε σεισμὸς ἀνὰ πᾶσαν, ὡς εἰπεῖν, τὴν οἰκουμένην· ὥστε καὶ πολλοὺς τῶν πύργων τῶν ἀνὰ τὴν βασιλίδαν πρηνεῖς ἐνεχθῆναι, συνπεσεῖν τε καὶ τὸ Χερρονήσου καλούμενον μακρὸν τεῖχος, διαχῆναι δὲ τὴν γῆν, καὶ πολλὰς κώμας ἐν αὐτῇ καταδύναι· πολλὰ τε αὖ καὶ ἀναρίθμητα γενέσθαι πάθη ἀνά τε γῆν καὶ κατὰ θάλασσαν· καὶ ἐνίας μὲν τῶν πηγῶν ξηρὰς ἀναδειχθῆναι· ἐτέρωθι δὲ, ὑδάτων πλῆθος ἀναδοθῆναι, μὴ πρότερον ὄν· δένδρα τε αὐτόπρεμνα σὺν τοῖς σφίσι ρίζαις ἀναβρασθῆναι· καὶ χώματα πλείστα ἐς ὄρη σχεδιασθῆναι· τὴν δὲ θάλασσαν, ἰχθῦς νεκροὺς ἀποσφενδονήσασθαι, καὶ πολλὰς τῶν ἐν αὐτῇ νήσων ἐπικλυσθῆναι· πλοῖα τε αὖ θαλάττια ἐπὶ τῆς ξηρᾶς ὀφθῆναι, τῶν ὑδάτων ἐς τοῦπίσω νοστησάντων· παθεῖν τε καὶ πολλὰ Βιθυνίας τε καὶ Ἑλλησπόντου, Φρυγίας τε ἑκατέρας. ὁ δὲ πάθος καὶ ἐπὶ χρόνον τῆς γῆς ἐπεκράτησεν, οὐχ ὥσπερ ἤρξατο οὕτω σφοδρῶς διαμένον· ἀλλὰ κατὰ μικρὸν λῆγον, μέχρις οὐ καθάπαξ ἐπέπαυστο.

It is interesting that Evagrius should stress the “universality” of the earthquake, introducing its “ecumenical” nature with the phrase ὡς εἰπεῖν (“so to speak”), thereby clearly showing that his words were chosen for rhetorical effect (see the discussion of the so-called “universal” earthquake of 365 in entry < 154 >). Moreover, Evagrius considers the earthquake to have been one of the major disasters of the reign of Theodosius II, hence mentioning it in the same paragraph as the ascent of Attila to the throne of the Huns.

Malalas specifies that the earthquake occurred at Nicomedia and Constantinople during the reign of Theodosius II [408-450]: “During his reign, Nicomedia, the metropolis of Bithynia, suffered its fifth calamity from the wrath of God. It happened late in the evening, and the city was razed to the ground and flooded by the sea. Theodosius built many buildings there, including the public baths, the colonnades, the harbour, the public arenas, the martyrion of St. Anthimus, and all the city’s churches [...] During his reign Constantinople suffered from the wrath of God for the first time. The earthquake occurred on the night of 26th January, extending from what are known as the Troad porticoes to the bronze Tetrapylon. The emperor went barefoot in a procession of prayer with the senate, the people and the clergy for many days”.

Ἐπὶ δὲ τῆς αὐτοῦ βασιλείας ἔπαθεν ὑπὸ θεομηνίας Νικομήδεια, μητρόπολις τῆς Βιθυνίας, τὸ πέμπτον αὐτῆς πάθος ἐσπέρας βαθείας, καὶ ἀπώλετο εἰς γῆν καὶ εἰς θάλασσαν καταποντισθεῖσα. καὶ πολλὰ ἔκτισεν ἐκεῖ καὶ τὰ δημόσια καὶ τοὺς ἐμβόλους καὶ τὸν λιμένα καὶ τὰ θεώρια καὶ τὸ μαρτύριον τοῦ ἁγίου Ἀνθίμου καὶ πάσας τὰς ἐκκλησίας αὐτῆς [...] Ἐπὶ δὲ τῆς αὐτοῦ βασιλείας ἔπαθεν ὑπὸ θεομηνίας πρῶτοις Κωνσταντινούπολις ὑπὸ σεισμοῦ μηνὶ Ἰανουαρίῳ κς’ ἐν νυκτὶ ἀπὸ τῶν λεγομένων Τρωαδῆσιων ἐμβόλων ἕως τοῦ χαλκοῦ τετραπύλου. ὅστις βασιλεὺς ἐλιτάνευσε μετὰ τῆς συγκλήτου καὶ τοῦ ὄχλου καὶ τοῦ κλήρου ἀνυπόδητος ἐπὶ ἡμέρας πολλὰς.

The *Chronicon Paschale* also tells of an earthquake at Constantinople in 447: “And in the same year there occurred great earthquakes, so that the walls collapsed. They

persisted for some time, so that no-one dared to remain at home, but all fled outside the city, chanting litanies day and night; for there was great peril, such as there had not been from the beginning of time. And some said that fire too had been seen in the heavens. Hence also the commemoration of the litany is celebrated annually up to the present day in the Triconch, because of the forbearance of the beneficent God, on the eighth day before the Ides of November [6 Nov.]. For amidst such great peril he did not kill anyone”.

Καὶ αὐτῷ τῷ ἔτει ἐγένοντο σεισμοὶ μεγάλοι, ὥστε τὰ τεῖχη πεσεῖν· ἐκράτησαν γὰρ ἐπὶ χρόνον, ὥστε μὴ τολμᾶν τινα ἐν οἴκῳ μένειν, ἀλλ’ ἐφυγον ἔξω τῆς πόλεως πάντες λιτανεύοντες ἡμέρας καὶ νυκτὸς· γέγονε γὰρ ἀπειλὴ μεγάλη, οἷα οὐ γέγονεν ἀπ’ ἀρχῆς· τινὲς δὲ ἔλεγον καὶ πῦρ ἐν τῷ οὐρανῷ τεθεᾶσθαι. ὅθεν καὶ ἡ ἀνάμνησις κατ’ ἔτος ἐπιτελεῖται μέχρι νῦν τῆς λιτανείας ὑπὲρ τῆς τοῦ φιλανθρώπου θεοῦ μακροθυμίας ἐν τῷ Τρικόνῳ πρὸ ἡ’ ἰδῶν νοεμβρίων. ἐν γὰρ τῇ τοσαύτῃ ἀπειλῇ οὐκ ἐθανάτωσέν τινας.

The suggestion that no-one was killed in the earthquake seems to run counter to what Marcellinus has to say; but, as we have seen, the latter explains that the deaths were not caused by collapsing masonry but by insanitary conditions; so there is no real inconsistency between the two texts.

The *Chronicon Paschale* reports an earthquake in 450 in similar terms, but it seems to be a doublet of this one: “In this year [450] in the month of Audynaues [January] during the night of the 26th, Constantinople suffered an earthquake extending from what are called the Troad porticoes to the bronze Tetrastyle. It lasted for some time, so that no-one dared to remain at home but all fled outside the city, chanting litanies together with the senate and the multitude and the clergy, going barefoot for many days. For there was great peril, such as there had not been from the beginning of time, and some said that fire too had been seen in the heavens. Hence also the remembrance of the litany is celebrated annually even to the present day in the Campus, because of the forbearance of the beneficent God. For amidst such great wrath no-one was killed”.

Τούτῳ τῷ ἔτει ἔπαθε Κωνσταντινούπολις ἀπὸ σεισμοῦ μηνὶ αὐδυναίῳ ς’ καὶ κ’ νυκτὸς ἀπὸ τῶν λεγόντων Τρωαδισίων Ἐμβόλων ἕως τοῦ χαλκοῦ Τετραπύλου ἐπὶ χρόνον, ὥστε μὴ τολμᾶν ἐν οἴκῳ τινα μένειν, ἀλλ’ ἐφυγον ἔξω τῆς πόλεως πάντες λιτανεύοντες ἡμέρας καὶ νυκτὸς. καὶ ὁ βασιλεὺς ἐλιτάνευσε μετὰ τῆς συγκλήτου καὶ τοῦ ὄχλου καὶ τοῦ κλήρου ἀνυπόδετος ἡμέρας πολλάς. γέγονε γὰρ ἀπειλὴ μεγάλη, οἷα οὐ γέγονεν ἀπ’ ἀρχῆς· τινὲς δὲ ἔλεγον καὶ πῦρ ἐν τῷ οὐρανῷ τεθεᾶσθαι. ὅθεν καὶ ἡ μνήμη κατ’ ἔτος ἐπιτελεῖται τῆς λιτανείας μέχρι καὶ νῦν ἐν τῷ Κάμπῳ ὑπὲρ τῆς τοῦ φιλανθρώπου θεοῦ μακροθυμίας. ἐν γὰρ τοσαύτῃ ὀργῇ οὐδεὶς ἐθανάτωθη.

In recording “earthquakes at Constantinople”, Cedrenus dwells on the religious aspects of what happened, and describes the miraculous in almost the same terms as Theophanes.

Nicephorus Callistus — a very late source — dates the earthquake to the time of Theodosius II. He adds that it lasted for six months, and includes Alexandria and Antioch amongst the cities affected. Earlier sources do not mention them. He also lists damage at Constantinople as well as in Bithynia, the Hellespont, Phrygia *maior et minor*, and most of the East.

The date 26 January comes from Malalas, the *Synaxarium* (which also gives the time as 2 p.m.) and hymn writing, where there is reference to the earthquake which occurred during the reign of Theodosius II: see Follieri (1966, p.301) and the *Typicon* of the Great Church, ed. Mateos (I, 1962, p.212 1-2).

The *Chronicon Paschale* gives the date as 6 November but, as Zecchini (1989) has

shown, this date clashes with that given by Marcellinus, for he talks of early 447. According to Zecchini, what the *Chronicon Paschale* describes is a doublet of another earthquake recorded by the *Chronicon Paschale* in 450, but which did not in fact occur in that year.

In a similar way, Grumel (1958) located the earthquake at Constantinople, and gave the date as 26 January 450. So did Downey (1955, p.597) and Hermann (1962, col.1108); and in this corpus of sources they distinguish two separate earthquakes: one in 437 and the other in 447. Croke (1981) also identifies two earthquakes, but he dates the first to 438 and the second to January 447. He also suggests that there is a doublet of the latter earthquake in a later one dated to 26 January 450 and recorded in the *Chronicon Paschale*, but in fact non-existent, his view being based on the numerous similarities to the passage on the earthquake of 447 (which, as we have seen, however, is dated to 6 November). The problem lies in the evidence provided by Malalas, according to whom this earthquake was the first manifestation of the wrath of God during the reign of Theodosius II. But as we have seen in connection with the earthquakes referred to in entries <170>, <173>, <174> and <177>, Malalas meant that it was the first destructive earthquake suffered by Constantinople during the reign of Theodosius II. Malalas in fact mentions a whole series of disasters, invasions and prodigies as occurring around the year 450 (it was, after all, the year in which Theodosius II died), which generally fit the narrative in the *Chronicon Paschale*, and may explain the confusion arising in the above source. Furthermore, it is not impossible that a minor tremor occurred on 6 November in 447 or even in 450; and indeed the twin passages in the *Chronicon Paschale* both refer to earthquakes with little destructive effect. In any case, this was a difficult time for Byzantium, and it is not surprising that the evidence provided by the chroniclers should be so confused. The earthquake of 447 became famous in historical writing, to the extent that it was wrongly located as far away as Italy. In that connection, see Palumbo (1989 b, pp.181-5).

<181> **September 450-457 • Tripolis (Syria)**

sources 1 Mal. 367

sources 2 [Dion. Tellmahr.] 766; Mich. Syr. 2.122-3

catalogues Schmidt (1881); Sieberg (1932 a); Hermann (1962); Guidoboni (1989)

Malalas records an earthquake at Tripolis in Syria: "During his [Marcian's, 450-457] reign the city known as Tripolis in Phoenice Maritima suffered from the wrath of God, at night, in the month of Gorpiaeus. He restored the summer bath known as the Icarus, which had collapsed. There were two bronze statues in it, which are also a wonderful sight, of Icarus and Daedalus and of Bellerophon and the horse Pegasus. He also reconstructed the Phacidion and several other buildings in the city, as well as the aqueduct".

Ἐπὶ δὲ τῆς αὐτοῦ βασιλείας ἔπαθεν ὑπὸ θεομηνίας ἡ λεγομένη Τρίπολις τῆς Φοινίκης παράλου μηνὶ γορπιαίῳ ἐν νυκτὶ. καὶ ἀνήγειρε τὸ δημόσιον τὸ θερινὸν πεσόντα τὸ λεγόμενον ὁ Ἰκαρος. ἦν γὰρ ἐν αὐτῷ χαλκουργήματα δύο. ἅτινα καὶ αὐτὰ εἰσι τῶν θαμάτων, ὁ Ἰκαρος καὶ Δαίδαλος καὶ ὁ Βελλεροφών καὶ ὁ Πήγασος ἵππος. καὶ τὸ Φακίδιον δὲ ἀνενέωσε καὶ ἄλλα φανερά τῆς πόλεως αὐτῆς σὺν τῷ ἀγωγῷ.

On the basis of evidence provided by Pseudo-Dionysius of Tellmahre, it is perhaps possible to narrow down the dating to 454-455.

<182> **April 451 Galicia**

sources Hydat. *Chron.* 149

catalogues Bonito (1691); von Hoff (1840); Mallet (1853)

Within our corpus of evidence, this is a rare case of an earthquake recorded for the western Mediterranean. Hydatius may have been writing from personal experience, or at least drawing on a reliable source, when he records in his *Chronicle*: “There were frequent earthquakes in Galicia, and many signs were shown in the sky. Thus, after sunset on the day before the Nones of April, that being the third holiday, the sky became as red as fire or blood in the north, and the fiery red was streaked with bright lines in the shape of flashing spears. The prodigy lasted from the close of day until almost the third hour of the night, and its meaning was soon to become apparent in the momentous events that followed”.

In Gallaecia terrae motus assidui, signa in caelo plurima ostenduntur. Nam, pridie non. Aprilis tertia feria, post solis occasum, ab aquilonis plaga, caelum rubens sicut ignis aut sanguis efficitur intermixtis per igneum ruborem lineis clarioribus in speciem hastarum rutilantium deformatis. A die clauso usque in horam noctis fere tertiam signi durat ostensio, quae mox ingenti exitu perdocetur.

⟨ 183 ⟩ **the night of 13–14 September 458 • Antioch**

- sources 1 Severus of Antioch *hom* 31 119-26, 128-30; Mal. 369; Evagr. 2.12; Theoph. 110
- sources 2 Gennad. *vir. ill.* 66; Ioh. Nikiu 88.1 (p.124 [244]/354 [474] Zotenberg = p.109 Charles); *Chron. Maron.* 140; [Dion. Tellmahr.] 227; *Chron.* 724 139-40; Cedren. 608
- literature Honigsmann (1944-45); Downey (1961); Jeffreys *et al.* (1986)
- catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Sieberg (1932 a); Grumel (1958); Hermann (1962); Guidoboni (1989)

Severus of Antioch has left us an emotional description of the earthquake which struck his city in September 458: “For you remember all of you old men how was the terrible and miserable sight which was placed before everybody’s eyes, when one could see old men as well as youths and children before their time dying suddenly together; women were buried alive, as their children were still moving at the breast, desiring to suck milk, and did not perceive death suspended above their heads; men who were out when their house was thrown down to the ground, thought they had escaped from danger, but, like runners who do not look in front of themselves, they reached another collapse and unwillingly walked to the death they were fleeing from.

Others had remained under a roof which was about to collapse and were not able to flee because of their old age or some other infirmity, or they received death like a divine decision, and said like the prophet: ‘Where shall I go away from your spirit and away from your face where shall I flee?’ They were saved admirably: they were closed in a pit and placed as in a cave; people tried to convince them to show themselves and to come out; only by their cries could one know they were not dead.

As others remained standing and uninjured, the walls collapsed here and there [...] Then appeared a man who had his shoulder or his leg broken, another whose hand had been cut or who had been beaten and wounded in the face by a big stone which had damaged and destroyed his face; who was he, nobody knew it, and he was lying half dead; although he could have been healed, there was nobody to rescue him: he was like somebody whose soul has vanished. Another, almost sound, beside a collapse, had the extremities of his members trapped, like a snared bird. Others had been knocked down by the houses together with their inhabitants, and those who survived could not even cry.

But as the houses had been shaken, their walls destroyed and their roofs caved in, those people were threatened by death; so those who were inside were crying out for air, wailing and mourning. And so, as they were bewailed by themselves, not with funereal tears but with tears preceding the burial, they got hit on their head by the

Evagrius provides an extraordinary wealth of detail in describing the effects of the earthquake on buildings in Antioch. The source he refers to is “John the Rhetorician”, which in all probability means the original version of Malalas, though the text seems to have been revised in style and details. See Jeffreys *et al.* (1986): “In the second year of the reign of Leo [458] there was a dreadful trembling and shaking of the earth in the city of Antioch. On various previous occasions the people of the city had behaved with a mad frenzy and a savagery beyond that of any wild animal, and this served, one might say, as a prelude to the coming great disaster. The earthquake reached a fierce climax in the year 506 of the era of the city [457-458], at about the fourth hour of the night, on the 14th of the month of Gorpiaeus, which the Romans call

September, early on Sunday, in the eleventh indiction. This was the sixth recorded earthquake, 347 years having passed since the one which occurred during the reign of Trajan. The latter occurred in the 159th year of the autonomy of the city [110/111], while that in the reign of Leo occurred in the 506th, as has been shown by those who have thoroughly investigated the matter. This earthquake destroyed nearly all the buildings in the new city, which was densely populated and had no vacant or completely undeveloped areas, but had been built up with great elegance through the generosity of the emperors, who vied with one another in their benefactions. The first and second buildings in the palace collapsed, but the others remained standing, as did the neighbouring baths, which had previously been unused, but now provided the city with essential washing facilities, since the disaster had destroyed the other baths. The earthquake also brought down the porticoes in front of the palace and the nearby Tetrastylon, as well as the towers at the gate of the hippodrome and some of the adjoining porticoes. In the old city, the porticoes and houses were completely untouched, but the baths of Trajan, Severus and Hadrian were slightly shaken and damaged. Some buildings collapsed in the Ostracine district; and what was called the Nymphaeum also collapsed, along with its porticoes. Details of all these occurrences have been carefully recorded by John the Rhetorician. He says that the city was exempted from 1000 talents of gold in tax, and the citizens were exempted from tax on buildings destroyed in the earthquake. The emperor also took responsibility for reconstructing public buildings".

Ἀνὰ δὲ τὸ δεύτερον ἔτος Λέοντος τῆς βασιλείας, κλόνος τῆς γῆς ἐξαίσιος καὶ βρασμός ἀνὰ τὴν Ἀντιόχου γίνεται, τινῶν μὲν παρὰ τοῦ κατ' αὐτὴν δήμου προγεγεννημένων, πρὸς πάσαν ἐκβακχευθέντων μανίαν, πάσης τε θηριώδους ἐπέκεινα γινόμενων γνώμης, ὥσπερ δὲ προοίμιον τοῖς τοιοῦτοις κακοῖς παρασχομένων. γίνεται γοῦν χαλεπώτατος ἔκτον καὶ πεντακοσιοστὸν ἔτος χρηματιζούσης τῆς πόλεως, περὶ τετάρτην ὥραν τῆς νυκτός, τετάρτην καὶ δεκάτην ἄγοντος ἡμέραν τοῦ γορπιαίου μηνός, ὃν σεπτέμβριον Ῥωμαῖοι προσαγορεύουσι, κυρίας ἐπικαταλαβούσης ἡμέρας, ἀνὰ τὴν ἐνδεκάτην ἐπινέμῃσιν τοῦ κύκλου. ἔκτος τυγχάνειν ἱστορούμενος ἑπτὰ καὶ τεσσαράκοντα καὶ τριακοσίων διωχηκότων ἐνιαυτῶν, ἐξότου ὁ κατὰ Τραϊανὸν γέγονεν. ἐκεῖνος μὲν γὰρ ἔννατον καὶ πεντηκοστὸν καὶ ἑκατοστὸν ἀγούσης τῆς πόλεως ἔτος τῆς αὐτονομίας γέγονεν· ὁ δὲ γε ἐπὶ Λέοντος, ἔκτον καὶ πεντακοσιοστὸν, ὡς τοῖς φιλοπονήσασιν ἐκτίθεται. οὕτως τοίνυν ὁ σεισμός τῆς Καινῆς τὰς οἰκίας ἀπάσας σχεδὸν καταβέβληκε, πολυανθρώπου ταύτης γεγεννημένης, καὶ οὐδὲν ἐχούσης ἔρεμον, ἢ ὅλως ἡμελημένον, ἀλλὰ καὶ λίαν ἐξησκημένης τῇ φιλοτιμίᾳ τῶν βασιλέων πρὸς ἀλλήλους ἀμιλλωμένων. τῶν τε βασιλείων ὁ πρῶτος καὶ δεύτερος οἶκος κατεβλήθησαν, τῶν ἄλλων σὺν τῷ παρακειμένῳ βαλανείῳ μεινάντων, τῷ γε καὶ λούσαντι τὴν πόλιν παρὰ τὴν συμφορὰν ἐκ τῆς πρότερον ἀχρηστίας, ἀνάγκη τῶν τοῖς ἄλλοις βαλανείοις συμβεβηκότων. κατέρριψε δὲ καὶ τὰς στοὰς τὰς πρὸ τῶν βασιλείων, καὶ τὸ ἐπ' αὐταῖς Τετράπυλον, καὶ τοῦ ἵπποδρόμου δὲ τοὺς παρὰ τὰς θύρας πύργους, καὶ τινὰς τῶν ἐπ' αὐτοὺς στοῶν. κατὰ δὲ τὴν παλαιάν, τῶν μὲν στοῶν ἢ οἰκημάτων πτώσις ὅλως οὐκ ἔψαυσε. τῶν δὲ Τραϊανοῦ καὶ Σεβήρου καὶ Ἀδριανοῦ βαλανείων, μικρὰ κατασεύσας, ἀνέτρεψε· καὶ τῆς γε Ὀστρακίνης οὕτω καλουμένης γειτονίας, τινὰ συγκατέβαλε σὺν ταῖς στοαῖς, καὶ τὸ καλούμενον Νυμφαῖον ῥίψας.

It is interesting to note that the sources seem to be aware that severe earthquakes struck the city of Antioch at regular intervals. The evidence provided by Evagrius suggests that a destructive earthquake occurred roughly every fifty-seven to sixty years.

Malalas gives the date as 13 September: "In the reign of Leo, Antioch the Great suffered its fourth calamity from the wrath of God, at dawn, on Sunday 13th September, in the year 506 according to the era of Antioch [458], during the consulship of Patricius".

Ἐν δὲ τῇ βασιλείᾳ Λέοντος ἔπαθεν ὑπὸ θεομηνίας Ἀντιόχεια ἡ μεγάλη τὸ τέταρτον αὐτῆς πάθος μηνὶ Σεπτεμβρίῳ γ' διαφασούσης Κυριακῆς ἔτους κατὰ τὴν αὐτὴν Ἀντιόχειαν χρηματίζοντος φς', ἐπὶ τῆς ὑπατείας Πατρικίου· καὶ ἐχαρίσατο τοῖς Ἀντιοχεῦσι καὶ τῇ πόλει λόγον κτισμάτων ὁ αὐτὸς βασιλεὺς πολλά.

[illegible]

Pseudo-Dionysius of Tellmahre dates the earthquake to somewhere between 456 and 459. Theophanes dates the Antioch earthquake to the year of the world 5950 [457/458]: “In that same year [the year of the world 5950] a terrible earthquake occurred at Antioch, and nearly all the city was reduced to ruins”.

Cedrenus places the earthquake in the first year of the reign of Leo I, who succeeded Marcian in February 457.

〈184〉 460 ●Cnidus, ●Cyzicus, ●the island of Cos,
the Cyclades islands, the Hellespont, Ionia, Thrace

Marcellinus writes that in the year 460: “The city of Cyzicus was shaken by an earthquake, and part of the city walls collapsed, so that for a long time it bewailed its own fate and that of its people”.

This seems to be the same earthquake as one recorded by Evagrius: "About the same time [459], when the Scythians [i.e. the Goths] were preparing to make war on the Eastern Romans, an earthquake struck Thrace, the Hellespont, Ionia, and the Cyclades islands. It was so severe that Cnidus and, among the islands, Cos were completely destroyed"

Υπὸ τοῖς αὐτοῖς χρόνοις, τοῦ Σκυθικοῦ πολέμου συνισταμένου πρὸς τοὺς ἐφῶους Ῥωμαίους, ἢ τε Θρακία γῆ καὶ ὁ Ἑλλήσποντος ἐσείσθη, καὶ Ἰωνία καὶ αἱ καλούμεναι Κυκλάδες νῆσοι, ὡς Κνίδου καὶ τῆς Κῷ τῶν νήσων τὰ πολλὰ κατενεχθῆναι.

The text of Evagrius (in the vulgata) is uncertain at this point. His editors, J.Bidez and L.Parmentier (1898), give τῆς Κρητῶν νήσου ("the island of the Cretans") instead of τῆς Κῷ τῶν νήσων. That would give us a location at Crete instead of Cos, but Crete seems less likely for geographical reasons.

⟨ 185 ⟩ **467 Ravenna**

sources Marcell. Com. 89.15-6

catalogues Manetti [1457]; Bonito (1691); Perrey (1848); Mallet (1853); Mercalli (1883); Baratta (1901); Carrozzo *et al.* (1973); Guidoboni (1989); Alexandre (1990)

The *Chronicon* of Marcellinus states: "An earthquake terrified the city of Ravenna".

Ravennam civitatem terrae motus deterruit.

This may have been an earthquake with its epicentre in the Apennines near Forlì or in southern Romagna — areas which were seismically active in early times.

⟨ 186 ⟩ **472 ●Asia Minor**

sources Marcell. Com. 90.24

literature Dagron (1974)

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Grumel (1958); Hermann (1962); Guidoboni (1989)

Marcellinus records an eruption of Vesuvius and an earthquake in Asia Minor in the year 472: "Some cities or fortified towns in Asia Minor were destroyed by an earthquake".

In Asia aliquantae civitates vel oppida terrae motu conlapsa sunt.

There is no other source for this earthquake.

⟨ 187 ⟩ **474-478 ●Rhodes**

sources The Great Chronogr. 1

literature Whitby and Whitby (1989)

catalogues Papazachos and Papazachos (1989)

The medieval *excerpta* of the Great Chronographer (which seem to derive from an important 6th century chronicle) record: "In the reign of Zeno, an earthquake occurred in Rhodes and destroyed the *gymnasia* and all the beauty of the city. And not long afterwards, in autumn, a great earthquake occurred in Byzantium".

ὅτι ἐπὶ τῆς βασιλείας Ζήνωνος σεισμὸς ἐν Ῥόδῳ γεγονώς τὰ τε γυμνάσια αὐτῆς καὶ εἴτι κάλλος ἐν τῇ πόλει κατέστρεψεν. καὶ μετ' οὐ πολὺν χρόνον ἐν φθινοπώρῳ γέγονεν εἰς τὸ Βυζάντιον σεισμὸς μέγας

The date can be deduced from the mention of an earthquake at Constantinople — very probably the one which occurred in 477/80 (see entry ⟨ 189 ⟩). There is a bibliography in Whitby and Whitby (1989, p.194 note 1).

<188> **dawn on a day in September 475 ●Gabala**

- sources 1 Mal. 378
sources 2 Ioh. Nikiu 88.35 (p.127 [247]/358 [478] Zotenberg = p.112 Charles); [Dion. Tellmahr.] 229;
Mich. Syr. 2.143
catalogues Sieberg (1932 a); Grumel (1958); Hermann (1962); Guidoboni (1989)

Malalas records: "During the reign of Basiliscus and his son Marcus [January 475-August 476], a city in First Syria named Gabala suffered from the wrath of God in the month of Gorpiaeus at dawn. The emperor Basiliscus bestowed 50 *litrai* of gold on the city for its reconstruction".

Ἐπὶ δὲ τῆς αὐτοῦ βασιλείας Βασιλίσκου καὶ Μάρκου τοῦ υἱοῦ αὐτοῦ ἔπαθεν ὑπὸ θεομηνίας πόλις τῆς Πρώτης Συρίας ὀνόματι Γάβαλα μηνὶ γορπιαίῳ εἰς τὸ αὐγος· καὶ ἐχαρίσατο τῇ αὐτῇ πόλει ὁ βασιλεὺς Βασιλίσκος εἰς ἀνανέωσιν χρυσίου λίτραις ν'.

Pseudo-Dionysius of Tellmahre dates the earthquake to 478/9.

<189> **24/25/26 September 477/480 ●Abydus, ●Constantinople, ●Gallipoli, ●Helenopolis, ●Lampsacus, ●Nicomedia, ●Sestos, ●the island of Tenedos ▷seismic sea-wave◁**

- sources 1 Marcell. Com. 92.6-10; The Great Chronogr. 1-2; Mal. 385; *Chron. Pasch.* 327-8; Theoph. 125-6
sources 2 Anon. *Eccl. Hist.* 112; Leo Gram. 116; Cedren. 618; Mich. Syr. 2.149
literature Stein (1949); Jeffreys *et al.* (1986); Whitby and Whitby (1989)
catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Capelle (1924); Grumel (1958); Hermann (1962); Shebalin *et al.* (1974); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

Marcellinus describes an earthquake which struck Constantinople: "For forty days in succession, the capital city was shaken by an incessant earthquake, and so greatly bewailed its affliction. Both the Troad porticoes collapsed. Some churches either split open or collapsed. The statue of Theodosius the Great on the spiral column in the Forum Tauri collapsed, as did two of its arches. The Byzantines commemorate that terrible day on the eighth day before the Calends of October [24 September]".

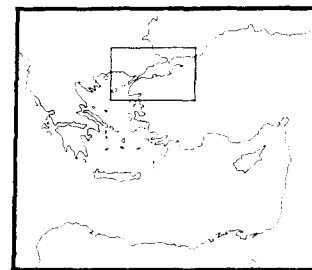
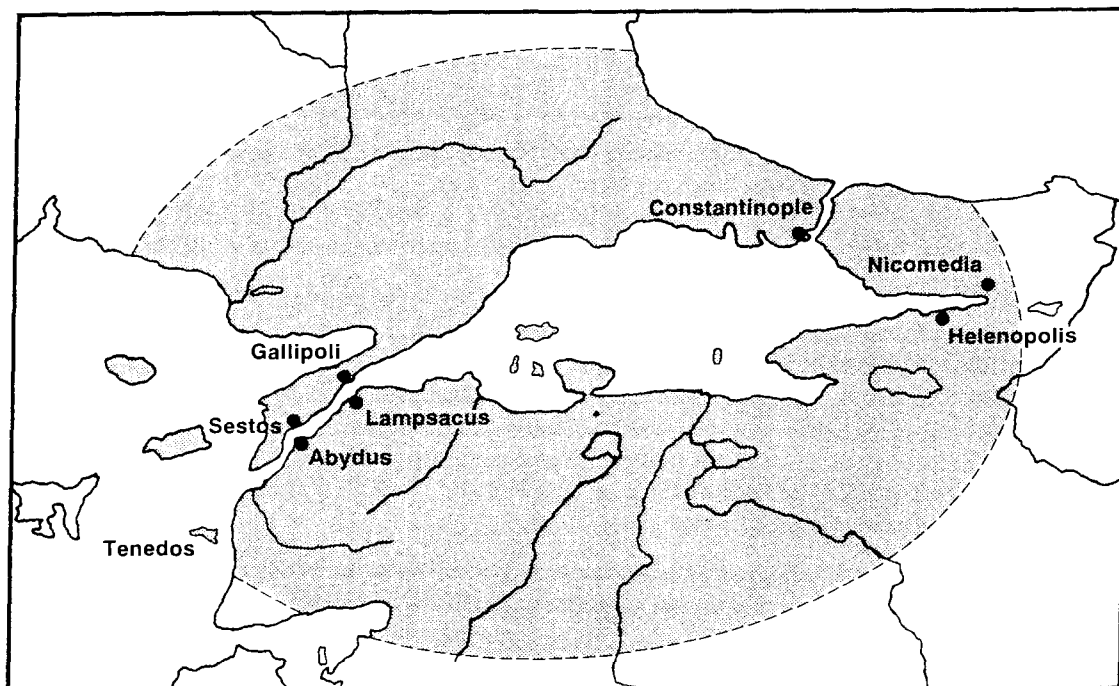
Urbs regia per quadraginta continuos dies adsiduo terrae motu quassata magnopere sese adflicta deplanxit. ambae Troadenses porticus conruerunt: aliquantae ecclesiae vel scissae sunt vel conlapsae: statua Theodosii magni in foro Tauri super cochlidem columnam posita conruit duobus fornicibus eiusdem conlapsis. hunc formidolosum diem Byzantii celebrant viii kal. octobris.

Malalas records: "During the reign of Zeno, Constantinople suffered its second calamity from the wrath of God: an earthquake over a small area as far as the Forum Tauri. Nicomedia, the metropolis of Bithynia, also suffered then, its sixth calamity, and so did Helenopolis in the same province. Zeno provided them with much assistance".

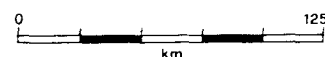
Ἐπὶ δὲ τῆς βασιλείας Ζήνωνος ἔπαθεν ὑπὸ θεομηνίας σεισμοῦ τὸ δεύτερον αὐτῆς πάθος Κωνσταντινούπολις ἐπὶ ὀλίγον διάστημα, ἕως τοῦ Ταύρου. ἔπαθε δὲ τότε καὶ Νικομήδεια, μητρόπολις τῆς Βιθυνίας, τὸ ἕκτον αὐτῆς πάθος, ὁμοίως δὲ καὶ Ἐλενούπολις τῆς αὐτῆς ἐπαρχίας· καὶ πολλὰ παρέσχεν αὐτοῖς ὁ αὐτὸς Ζήνων.

The Slav translation of Malalas (see Jeffreys *et al.* 1986) also provides the date: "25 September in the first indiction".

In addition to Malalas, what are known as the *excerpta* by the Great Chronographer are also an important source for this earthquake. They report its effects over a vast area and also mention a seismic sea-wave at Constantinople: "And not long afterwards [i.e. after the earthquake in Rhodes: see entry (187)], in autumn, a great earthquake struck Byzantium, causing the collapse of many houses, churches, and porticoes and burying great numbers of people. The orb of the statue in the Forum also fell down, as did the monument to Theodosius the Great bearing his statue on a column in the Forum Tauri. The sea became very wild, rushed right in, engulfed a part of what had formerly been land, and destroyed several houses. The earthquake continued for 30 days, with the result that a considerable part of the walls also collapsed. All the towers and many other buildings were destroyed, and the city stank from the corpses; and the areas outside the city and the Golden Gate were all demolished. Also in the reign of Zeno, a strong earthquake occurred, causing substantial damage. For in the Hellespont area it damaged most of the cities of Abydus and Lampsacus, and in Thrace it reduced Callipolis and Sestus to ruins, as well as most of Tenedos; and 50 towers of the Long Walls were also demolished, and all those who had fled there were buried in them. In the area around Sestus a sort of mud welled up from the earth and immediately became stiff and solid".



24/25/26 September
477/480



καὶ μετ' οὐ πολὺν χρόνον ἐν φθινοπώρῳ γέγονεν εἰς τὸ Βυζάντιον σεισμὸς μέγας ὡς πολλοὺς οἴκους καὶ ἐκκλησίας καὶ ἐμβόλους καταπεσεῖν. κατεχώσθη δὲ καὶ πλῆθος ἀνθρώπων ἀναρίθμητον. ἔπεσε δὲ καὶ ἡ σφαῖρα τοῦ ἀνδριάντος τοῦ Φόρου καὶ ἡ στήλη τοῦ μεγάλου Θεοδοσίου ἢ εἰς τὸν κίονα τοῦ Ταύρου ἢ τε θάλασσα ἀγριωθεῖσα πορρωτάτῳ ἐξέδραμε καὶ τῆς προτέρας γῆς περιλαβοῦσα μέρος οἴκους οὐκ ὀλίγους καταβάλλει. ἀστέρες τε κατέπεσον ἐπὶ θάλασσαν, σφαῖραις πυρὸς ὅμοιοι, καὶ θερμὸν αὐτῆς τὸ ὕδωρ ἐποίησαν. διήρκησε δὲ ὁ τοιοῦτος σεισμὸς ἐπὶ ἡμέρας συνεχεῖς καὶ τῶν τειχῶν μέρος οὐκ ὀλίγον καταπεσεῖν καὶ πύργους ἅπαντας καὶ πολλὰ οἰκήματα ἀνατραπῆναι καὶ τὴν πόλιν ὑπὸ τῶν νεκρῶν ἐπόζεσθαι. τὰ δὲ ἔξω τῆς πόλεως καὶ τῶν Χρυσῶν Πυλῶν πάντα κατενεχθῆναι. ὅτι ἐπὶ τῆς βασιλείας τοῦ αὐτοῦ Ζήνωνος κινήσεως [γὰρ] ἰσχυρᾶς γινομένης βλάβην οὐ τῆβ τυχούσαν εἰργάσατο. κατὰ γὰρ τὸν Ἑλλησπόντου πορθμὸν Ἀβύδου τε καὶ Λαμψάκου τῶν πόλεων συνέσχε τὰ πλείω καὶ

περὶ τὸ θρακῶν κλίμα Καλλιόπολις καὶ Σηστός κατέπεσον τῆς τε πόλεως Τενέδου πλείστον κατέπεσε. κατηνέχθησαν δὲ καὶ τῶν μακρῶν τειχῶν πύργοι ν', εἰς οὓς συνεχώσθησαν πάντες οἱ ἐκεῖσε φυγόντες. εἰς δὲ περὶ Σηστόν τόπον βορβορῶδες ἐκ γῆς τι ἀνέκλυσεν, ὃ παγὲν εὐθὺ πίσσα γέγονε.

It is not clear whether the "Long Walls" referred to were at Constantinople or Gallipoli: see the bibliography in Whitby and Whitby (1989, p.194, note 2).

The *Chronicon Paschale* records an earthquake at Constantinople: "Indiction 10, year 13, sole consulship of Boethius [487]. In this year Constantinople suffered its second affliction from divine wrath in the form of an earthquake which struck the city over the short distance as far as the Taurus, in the month of Gorpiaeus, on 26 September".

Τούτῳ τῷ ἔτει ἔπαθεν ἀπὸ θεομηνίας σεισμοῦ Κωνσταντινουπόλις τὸ δεύτερον αὐτῆς πάθος μηνὶ γορπιαίῳ σεπτεμβρίῳ κς' ἐπ' ὀλίγον διάστημα ἕως τοῦ Ταύρου.

The *Anonymous Ecclesiastical History* gives the date as 25 September.

Theophanes gives the date as 25 September 477 [year of the world 5970], and adds: "Many churches, houses and porticoes collapsed to the ground and countless numbers of people were buried. The globe of the statue in the Forum also fell, as did the statue of Theodosius the Great on the column in the Forum Tauri, and also the inner walls for a considerable distance. The earthquake lasted a long time, so that the city began to stink".

Τούτῳ τῷ ἔτει ἐγένετο σεισμός φοβερός ἐν Κωνσταντινουπόλει μηνὶ Σεπτεμβρίῳ κς', Ἰνδικτιῶνι α', καὶ ἔπεσον ἐκκλησίαι πολλαὶ οἰκίαι τε καὶ ἔμβολοι ἕως ἐδάφους, κατεχώσθη δὲ πλήθη ἀναρίθμητα ἀνθρώπων. ἔπεσε δὲ καὶ ἡ σφαῖρα τοῦ ἀνδριάντος τοῦ Φόρου καὶ ἡ στήλη τοῦ μεγάλου Θεοδοσίου, ἡ εἰς τὸν κίονα τοῦ Ταύρου, καὶ τὰ ἔσω τείχη ἐπὶ διάστημα ἱκανόν· καὶ ἐκράτησεν ὁ σεισμός χρόνον πολύν, ὥστε τὴν πόλιν ἐποξέσαι.

Cedrenus takes up all these pieces of information: "In that year [the fourth of the reign of Zeno, i.e. 477], there was a terrible earthquake at Constantinople on 25 September, and many churches, houses and porticoes were razed to the ground, burying a very large number of people. The orb on the statue in the forum also fell down, as did the statue of Theodosius the Great on the column in the Forum Tauri, and a considerable part of the inner wall. The earthquake lasted for a long time, with the result that the city was full of noxious exhalations".

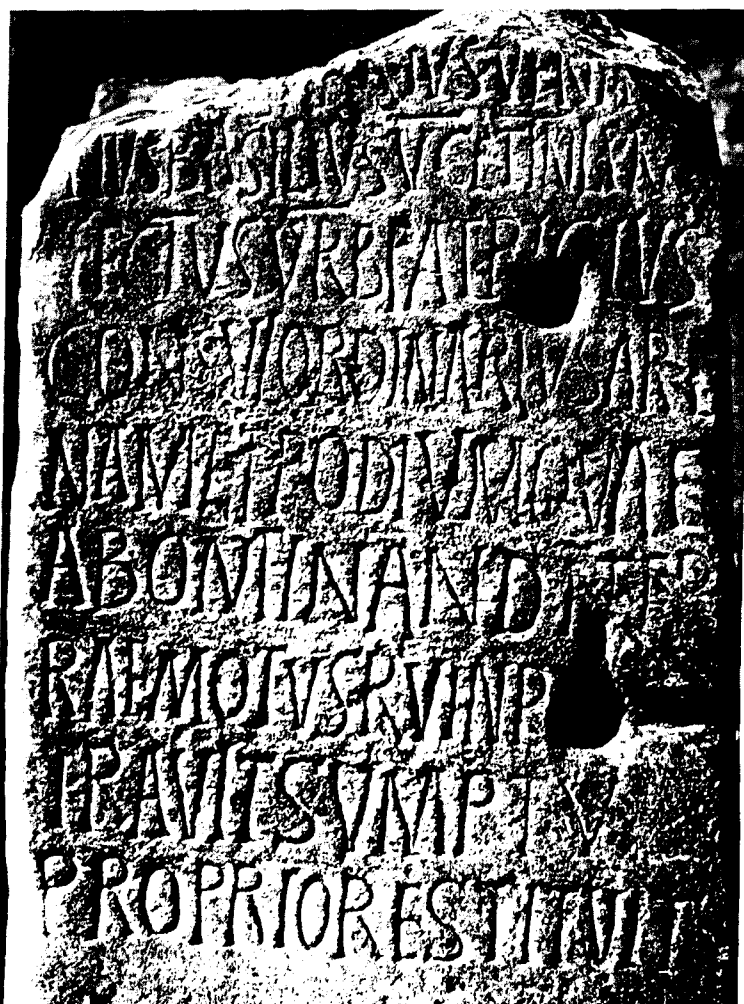
Τῷ δ' ἔτει ἐγένετο σεισμός φοβερός ἐν Κωνσταντινουπόλει, μηνὶ σεπτεμβρίῳ κς', καὶ ἔπεσον ἐκκλησίαι πολλαὶ καὶ οἰκίαι καὶ ἔμβολοι ἕως ἐδάφους, κατεχώσθη δὲ πλήθος ἀνθρώπων ἀναρίθμητον. ἔπεσε δὲ καὶ ἡ σφαῖρα τοῦ ἀνδριάντος τοῦ φόρου, καὶ ἡ στήλη τοῦ Μεγάλου Θεοδοσίου ἡ εἰς τὸν κίονα τοῦ Ταύρου, καὶ τὰ ἔσω τείχη περὶ διάστημα ἱκανόν. καὶ ἐκράτει ὁ σεισμός χρόνον πολύν, ὥστε τὴν πόλιν ἐποξέσαι.

The sources give different locations and dates for this earthquake. Marcellinus places it at Constantinople on 24 September 480, Malalas at Nicomedia and Helenopolis during the reign of Zeno [474-475; 477-491]; the *Chronicon Paschale* records an earthquake at Constantinople during the consulship of Boethius, in the tenth indiction [487], on 26 September; Theophanes dates it to 25 September 477, as does Cedrenus; Leo Grammaticus, while writing about Constantinople and Nicomedia, simply dates it to the reign of Zeno.

Stein (1949, p.787) does not take the Great Chronographer into consideration, and suggests the year 478; Hermann (1962, col.1109) identifies two earthquakes, dating one to 477/478 and the other to 488. In actual fact, however, we do not have sufficient evidence to establish a clear date for the earthquake. Since Theophanes considers this earthquake to be the second great disaster to have struck Constantinople (using

an expression which clearly derives from Malalas), we are bound to suppose that the first was the earthquake of 447, but the context suggests a mistake in dating; so the earthquake must have occurred round about 478. For the chronological discrepancies between the various sources, see Stein (1949, p.787).

An inscription by Decius Marius Venantius Basilius referring to work carried out at the Flavian Amphitheatre in Rome to repair damage caused by an earthquake in the 5th-6th century A.D. (Anfiteatro Flavio, Rome, photo Soprintendenza Archeologica di Roma).



<190> a few years before 484 or 508 • Rome

inscriptions *CIL* 6.1716(a) = 32094(a) = *ILS* 5635; the same text, with a slightly different layout can be found in *CIL* 6.1716(b) = 32094(b) and 1716(c) = 32094(c)

literature Burnand (1984); Priuli (1986); *Catalogo epigrafi* (1989); Molin and Guidoboni (1989); Rea (1993)

catalogues Mallet (1853); Baratta (1899, 1901); Galli (1906); Carrozzo *et al.* (1973); Guidoboni (1989)

There is an inscription (*CIL* 6.1716b = 32094b = *ILS* 5635) preserved inside the Flavian Amphitheatre — also known as the Colosseum — which records restoration work on the arena and podium there, following a “terrible earthquake”. It reads: “(Statue) of Venantius, eminent senator and consul. Decius Marius Venantius Basilius, prefect of the city, patrician and ordinary consul, at his own expense restored the arena and podium which the disaster of a terrible earthquake had destroyed”.

(Signum) Venanti / v(iro) c(larissimo) / co(n)s(uli). / Decius Marius Ve/nantius Basilius, / v(ir) c(larissimus) et inl(ustris) praefectus / urbi, patricius, cons(ul) / ordinarius, arenam / et podium quae abomi/nandi terrae motus / ruina prostra/vit sumptu proprio restituit.

Underlining in inscription is a convention to indicate lost text.

The same text appears in various inscriptions, but unfortunately the most complete of these (CIL 6.1716(a) = 32094(a) = ILS 5635 — see above) has been lost. Various hypotheses were put forward by the first scholars who examined the text as to the earthquake and the identity of Decius Marius Venantius Basilius. Current scholarship tends to identify Decius Marius Venantius Basilius as the consul for 484 AD, rather than 508. Recently, however, Priuli (1986, p.144) has returned to the suggestion that the consul in the inscription is the one for 508. There is no other source about this earthquake, which probably damaged Rome severely. It occurred a few years before 484 or, in accordance with the other hypothesis, a few years before 508 AD.

<191> **the night of 26 May 492 Ravenna?**

- sources 1 *Fasti Vind. Prio.* 318
sources 2 *Exc. Sangall.* 20; Agnellus *Lib. Pont. Eccl. Rav.* 303
catalogues Bonito (1691); Perrey (1848); Mercalli (1883); Baratta (1901); Carrozzo *et al.* (1973); Guidoboni (1989)

According to the *Fasti Vindobonenses Priores*: "During the consulship of Anastasius, emperor for life, and Rufus there was an earthquake during the night before cockcrow on the seventh day before the Calends of June [26 May 492]".

Anastasio p(er)p(etuo) Aug. et Rufo. his cons. terrae motus factus est noctu ante pullo- rum cantus vii kal. Iun.

Andreas Agnellus also mentions the earthquake in the *Liber Pontificalis Ecclesiae Ravennatis*. This suggests that the earthquake may have been felt at Ravenna, though he does not specifically mention the city, and dates the tremor to 26 December of the previous year (*vii kal. Ianuarii*). O. Holder-Egger — the editor of Agnellus' work for the *Monumenta Germaniae Historica* — thinks that *Ianuarii* should read *Iunii*.

<192> **494 ●Agathicum, ●Hierapolis (Phrygia), ●Laodicea (Phrygia), ●Tripolis (Phrygia)**

- sources Marcell. Com. 94.22-3
literature Robert (1962); Gatier (1984)
catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Sieberg (1932 a); Grumel (1958); Plassard (1968); Hermann (1962); Guidoboni (1989)

In his *Chronicon*, Marcellinus records that during the consulship of Asterius and Praesidius, in the second indiction [494], a very serious earthquake affected some cities of Phrygia: "Laodicea, Hierapolis, Tripolis, and Agathicum were all reduced to ruins at the same time by an earthquake".

Laudicia, Hierapolis et Tripolis atque Agathicum uno tempore unoque terrae motu con- lapsae sunt.

Gatier (1984, pp.87 and 91, notes 3-5) has pointed out that the cities mentioned by Marcellinus are those in Phrygia, rather than the ones of the same name in Syria, as recorded, for example, in the catalogues of Sieberg (1932 a), Grumel (1958) and Hermann (1962).

The location of Agathicum is still uncertain. It may perhaps be identified as Agathe Kōmē, which, according to Robert (1962, p.233, note 1) is not near Alacin but in the plain of Sarayköy (Gatier 1984, pp.87 and 91, note 4).

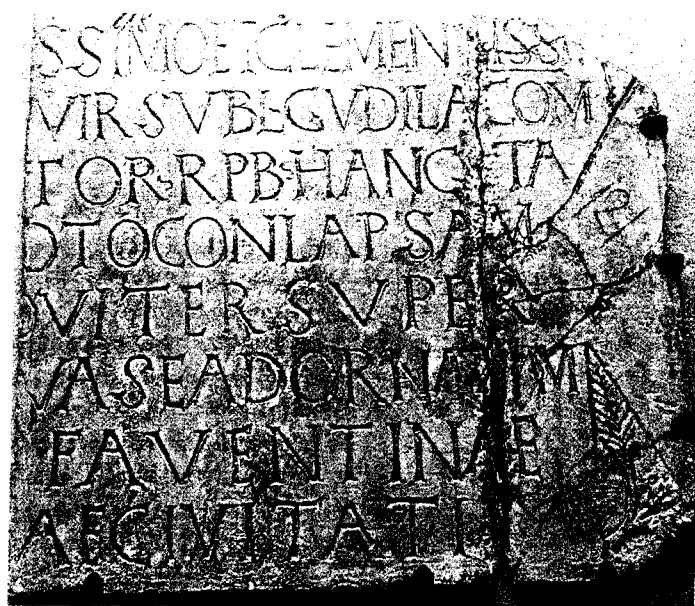
⟨ 193 ⟩ **a night in September 499** ●Arsamosata, ●Neocaesarea,
●Nicopolis (Armenia)

sources 1	[Ios. Styl.] <i>Syr. versio</i> 27-30; Marcell. Com. 95; <i>Chron. Edes.</i> 8; Theoph. 144
sources 2	[Dion. Tellmahr.] 259-62, 275; <i>Chron.</i> 819 7; <i>Chron.</i> 846 218-9; Cedren. 628; Mich. Syr. 2.160; <i>Chron.</i> 1234 190; Sam. An. 72; <i>Anon. Eccl. Hist.</i> 109
literature	Cumont (1905); Gatier (1984); Russell (1985)
catalogues	Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Abich (1882); Sieberg (1932 a); Amiran (1950-51); Grumel (1958); Guidoboni (1989); Zevt'unvan (1991)

The text of Pseudo-Joshua the Stylite contains a detailed description of the effects of an earthquake on the city of Nicopolis with particular attention to the behaviour of the inhabitants. In chapter 33, the chronicle had dealt with the disasters which occurred in the year 810 [498/499], including a plague of locusts which was held to foreshadow "great earthquakes in the land". In chapter 34 he records: "The year 810 [of the Greeks; i.e. 499 A.D.]... In the month of Elul [September] there was a violent earthquake, and a great sound was heard from heaven over the land, so that the earth trembled from its foundations at the sound; and all the villages and towns heard that sound and felt the earthquake. Alarming rumours and evil reports came to us from all quarters; and, as some said, a marvellous sign was seen in the river Euphrates and at the hot spring of Abarne... [there follows a commentary on Psalm xviii. 7ff.]. There came too in the course of this month a letter, which was read in church before the whole congregation, stating that Nicopolis had fallen to the ground of a sudden at midnight and overwhelmed all its inhabitants. Some strangers too who were there, and certain brethren from our schools who were travelling thither and happened to be on the spot, were buried [in the ruins]. Their companions who came [back from thence] told us [this]. The whole wall of the city all round, and everything that was within it, was overturned in that night, and not one person of them remained alive, save the bishop of the town and two other men, who were sleeping behind the apse of the altar of the church. When the ceiling of the room in which they were sleeping fell, one end of its beams was propped up by the wall of the altar, and so it did not bury them. A certain brother, whose veracity can be depended upon, has told me as follows. 'At eventide of the night when Nicopolis fell, we were lying down inside the town, I and a companion of mine. He was very restless, and said to me, 'Get up, and let us go and pass the night outside of the town in yonder cave, as is our custom, for I cannot get rest here, because the air is so sultry and sleep will not come to me'. So we got up, I and he... [they go and sleep in a cave outside the town and come back in the morning] We came into the town and found all its houses overturned, and the people and the cattle, the oxen and the camels, buried therein; and the sound of their groaning was coming up from under the ground [...]. Again, in the north there was a church called that of Arsamosata, which was very strongly built and beautifully decorated [...]. When there was a great crowd collected of men and women and children, of every age and class, there were terrible flashes of lightning and violent peals of thunder and frightful noises; and all the people fled to the church, to seek refuge with the bones of the saints. And whilst they were in great fear, and were engaged in prayer and service at midnight, the church fell in and crushed beneath it the greater part of the people who were in it. This happened on the same day on which Nicopolis fell'".

[illegible]

An inscription recording the collapse of a statue in Faenza as a result of an earthquake during the reign of Theodoric the Great (Museo Arcivescovile, Ravenna, photo SGA).



〈 194 〉 **about the first quarter of the 6th century Faenza**

sources Anon. Val. 14.84

inscriptions CIL 11.268

literature Spreti (1793); Cipolla (1892); Ho Peng Yoke (1962); *Catalogo epigrafi* (1989)

catalogues Guidoboni (1989)

The second fragment of the work known as the *Chronica Theodericiana*, by the Anonymus Valesianus, concerns the period 474-526 and includes mention of a comet, linked to a vague report of earthquakes, but its date is by no means certain: "A star with a fiery tail, of the kind known as a comet, appeared and shone for fifteen days, and there were frequent earthquakes".

Stella cum facula adparuit, quae dicitur come[te]s, [s]p[l]endens per dies xv et terrae mota frequenter fuerunt.

There is an inscription from Faenza in the Museo Arcivescovile at Ravenna, dating to the time of Theodoric the Great (493-526), which commemorates the replacement of a statue knocked down in an earthquake at the city of Faenza during the reign of Theodoric: "[In view of the safety of that ---] very clement [---] and distinguished man, Gudila, a *comes* [--- in charge of the administra]tion of the city, this sta[tue] which collapsed in an [earthqu]ake [---n]ewly on its base [---] for the embellishment of [---] of the city of Faenza [---]".

[Salvo ---i]ssimo et clementissim[o] / [---] vir subl(imis) Gudila, com(es) / [---] cura]tor r(ei) p(u)b(licae), hanc sta[]tuam terrae m]oto (sic) conlapsam / [--- n]oviter super / [---] vase (sic) ad ornatum / [---] Faventinae / [---]ae civitati[s?].

The Gudila mentioned in the inscription was a *vir sublimis* and *maior Domus Regiae* in 502 (PLRE II, p.521). The inscription is unfortunately seriously defective and has not been studied sufficiently. Various interpretations have been put forward (see Bormann, G.B.de Rossi and Mommsen in CIL 11, p.51; Spreti 1793, I, p.201, no.22 and II, pp.12-3).

There are certain difficulties in establishing the text of the Anonymus Valesianus (*comes* or *cometes*, *pendens* or *splendens*; see Cipolla 1892, pp.39 and 43), and its vagueness makes it difficult to reach a better understanding of when and where the earthquake it refers to occurred. Since, however, the work pays particular attention to the events of the reign of Theodoric, it may well be that these tremors involved the territory of Ravenna. It is also difficult to establish whether the Anonymus Valesianus and the Faenza inscription are referring to the same earthquake.

Chapter 84, which contains the report of the comet and the earthquake, comes immediately before the account of the execution of Boethius and Symmachus in 524 and 525. Cipolla (1892, p.93), however, maintains that this chapter is completely unconnected to those which immediately precede and follow it, in which case it is even more difficult to establish a date for the phenomena referred to.

At least, however, mention of the sighting of a comet enables us to compare with entries in the catalogue of comets and novae recorded by Chinese sources (Ho Peng Yoke 1962, p.164). Five astronomical phenomena are reported for the period 474-526: what may have been a nova in November-December 483, and four comets: in December 498, February or April 501, August 507 and October 520. It is interesting to note that the description of the 520 comet in oriental sources as being "as bright as a flame" is strangely similar to that provided by the Anonymus Valesianus.

⟨ 195 ⟩ **9 October 501 c.6/7a.m. Ravenna?**

sources 1 *Fasti Vind. Post.* 330

sources 2 *Exc. Sangall.* 20

catalogues Guidoboni (1989); Alexandre (1990)

The *Fasti Vindobonenses Posteriores* (and the *Excerpta Sangallensia*) record an earthquake in the year 501: "There was an earthquake at the first hour [between 6 and 7 in the morning] on Tuesday, the seventh day before the Ides of October [9 October 501], during the consulship of Avienus and Pompeius".

Avieno et Pompeio Terrae motus fuit vii id. Octb. die Martis hora prima.

Since the source known as the *Fasti Vindobonenses* consists of annals written at Ravenna, we have sound reasons for arguing that this earthquake occurred, or was at least felt there (see also entry ⟨ 196 ⟩).

⟨ 196 ⟩ **14 April 502 Ravenna?**

sources 1 Victor Tonn. *Chron.* 193; *Fasti Vind. Post.* 330

sources 2 *Exc. Sangall.* 20

catalogues Guidoboni (1989); Alexandre (1990)

Victor, bishop of Tunnuna (6th century) reports that: "during the consulship of Avienus Junior, a great earthquake occurred, with great flashes of light and thunder, and with hail and a great disturbance of earth and sky".

Avieno Iuniore Cons. Ingens terrae motus cum coruscationibus et tonitruis magnis atque grandine et totius caeli ac terrae commotione factus est.

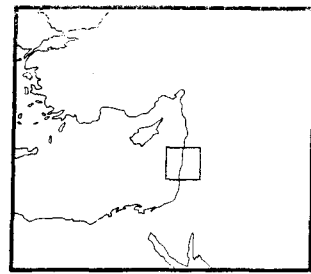
The *Fasti Vindobonenses Posteriores* mention an earthquake on Easter Day 502: "On Easter Day, the eighteenth day before the Calends of May [14 April], during the consulship of Avienus Junior and Probus, there was an earthquake".

Abieno iun. et Probo Terrae motus fuit in pascha xviii kl. Maias.

It is impossible to be sure that both references are to the same earthquake.

The *Fasti Vindobonenses* (and the *Excerpta Sangallensia*, which describe the earthquake in the same terms) provide more chronological information than the chronicle of Victor, bishop of Tunnuna. The argument set out in entry ⟨ 195 ⟩ also applies to the question of where this earthquake took place.

It may be, however, that Victor of Tunnuna is referring to the great earthquake of 22 August in the same year (see entry ⟨ 197 ⟩).



Although this earthquake seems to have principally struck the coast of southern Lebanon, Russell (1985, pp.43-4) points out that places in Palestine were also affected. Hence he also relates it to a small hoard of coins struck during the reign of Anastasius I (491-518) found at Gush Halav.

〈 198 〉 **a night about the year 515 •the island of Rhodes**

- sources 1 Mal. 406; Evagr. 3.43
sources 2 [Dion. Tellmahr.] 815; Mich. Syr. 2.160
catalogues Ligorio [1574-7]; Bonito (1691); Schmidt (1881); Sieberg (1932 a); Grumel (1958); Galanopoulos (1961); Hermann (1962); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

Malalas records this earthquake as having occurred during the reign of Anastasius [491-518]: "During his reign the island of Rhodes suffered its third calamity from the wrath of God, at night. The emperor gave generously both to the survivors and to the city for building purposes".

Επὶ δὲ τῆς αὐτοῦ βασιλείας ἔπαθεν ὑπὸ θεομηνίας ἡ Ῥόδος νῆσος τὸ τρίτον αὐτῆς πάθος νυκτός· καὶ πολλὰ αὐτοῖς τοῖς περιλεφθεῖσιν ἐχαρίσατο καὶ τῇ πόλει λόγῳ κτισμάτων.

Evagrius mentions the earthquake after the defeat of Vitalianus in 514 and after the incursion of the Huns, which can be dated to c.515: "About the same time Rhodes suffered a violent earthquake at the dead of night. This was in fact its third earthquake".

Πέπονθε δὲ ὑπὸ σεισμῶν ἐξαισίων ἀνὰ τοὺς αὐτοὺς χρόνους καὶ ἡ Ῥόδος, τρίτου ἐκείνου πάθος, ἄωρεϊ τῶν νυκτῶν.

In actual fact, earthquakes in Rhodes were much more frequent than he suggests. Pseudo-Dionysius of Tellmahre wrongly dates the earthquake to 503/504. Grumel (1958, p.478) dates the earthquake to about 515, and Hermann (1962, col.1109) dates it to 516.

〈 199 〉 **518 •Sarnontus, •Scupus, •Dardania
▷landslides, surface faulting? eruption?◁**

- sources Marcell. Com. 100.7-18
catalogues Manetti [1457]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Morelli (1942); Grumel (1958); Shebalin *et al.* (1974); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

Marcellinus writes of an earthquake in the province of Dardania, in southern Illyria, in the year 518 which destroyed twenty-four villages, and he provides a rough but interesting scale of its effects, as well as a vivid picture of the upheaval of the terrain. Unfortunately, there is insufficient evidence to identify the villages, which he refers to only in general terms: "As a result of a prolonged earthquake in the province of Dardania, twenty-four villages were destroyed at the same time. Two of these were lost with all their inhabitants, four lost half their buildings and many inhabitants, eleven lost a third of their houses and as many people in the disaster, seven lost a quarter of their buildings and all their inhabitants, and nearby places were avoided for fear of collapsing buildings. The town of Scupus, in fact, was razed to the ground, though its citizens survived by fleeing the danger. Many mountains throughout the province were rent by the earthquake, rocks were torn from their place, and trees were

uprooted. A deep chasm stretching for thirty miles [c.43.5 km] and measuring twelve feet [c.3.6 m] across opened up and engulfed some villagers and masonry, or else it forced those who were in flight from their enemy to take particular action. At a village called Sarnontus in the Gavisa region, the veins of the earth burst open and, glowing like a fiery furnace, it emitted a continuous and seething rain of fire”.

In provincia Dardania adsiduo terrae motu viginti quattuor castella uno momento conlapsa sunt: quorum duo suis cum habitatoribus demersa, quattuor dimidia aedificiorum suorum hominumque amissa parte destructa, undecim tertia domorum totidemque populi clade deiecta, septem quarta tectorum suorum totaque plebis parte depressa, vicina vero metu ruinarum despecta sunt. Scopus namque metropolis, licet sine civium suorum hostem fugientium clade, funditus tamen corruit. plurimi totius provinciae montes hoc terrae motu scissi sunt saxaque suis evulsa conpagibus devolutaque arborum crepido. per triginta passuum milia patens et in duodecim pedum latitudinem dehiscens profundam aliquantis voraginem civibus castellorum saxorumque ruinas vel adhuc hostium incursiones fugientibus iussa paravit. uno in castello regionis Gavisae, quod Sarnonto dicitur, ruptis tunc terra venis et ad instar torridae fornacis exaestuans diutinum altrinsecus ferventemque imbrem evomuit.

〈200〉 521/522 ●Dyrrachium

sources 1 Mal. 417-8

sources 2 Evagr. 4.8; [Dion. Tellmahr. 52]; Theoph. 168.8-11; Cedren. 638

catalogues Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Morelli (1942); Grumel (1958); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

Malalas writes: “In that year [521/522] it happened that the place known as Dyrrachium, a city in the province of Nova Epirus, the birthplace of the emperor Anastasius, suffered from the wrath of God. Anastasius had built many buildings there and had supplied it with a hippodrome. For his part, the emperor Justin had even provided the city of Dyrrachium with much money for reconstruction; it had formerly been called Epidamnus. He also gave generously to the survivors”.

Ἐν δὲ τῷ αὐτῷ χρόνῳ συνέβη παθεῖν ὑπὸ θεομηνίας τὸ λεγόμενον Δορράχιον, πόλιν τῆς νέας Ἠπείρου ἐπαρχίας, ἐξ ἧς ὑπῆρχεν Ἀναστάσιος ὁ βασιλεὺς· ὅστις καὶ πολλὰ ἔκτισεν ἐκεῖ παρεσχηκῶς αὐτοῖς καὶ τὸ ἵπποδρόμιον Ὁ δὲ βασιλεὺς Ἰουστίνος πολλὰ παρέσχεν εἰς ἀνανέωσιν τῇ αὐτῇ Δορραχηνῶν πόλει. ἥτις πρῶην μὲν ἐλέγετο Ἐπίδαμνος· ὁμοίως δὲ καὶ τοῖς περιλεφθεῖσιν ἐφιλοτιμήσατο.

Pseudo-Dionysius of Tellmahre wrongly gives the date as 528/529. The context shows that this earthquake took place before the Corinth earthquake (see entry 〈201〉).

〈201〉 521/522 ●Corinth

sources 1 Mal. 418

sources 2 Evagr. 4.8; Jac. Edess. 318; [Dion. Tellmahr.] 52; Theoph. 168; Leo Gramm. 319-20; Cedren. 638; Niceph. Call. 111-2

literature Meyer (1979); Finley and Pleket (1980)

catalogues von Hoff (1840); Bonito (1691); Mallet (1853); Schmidt (1881); Grumel (1958); Galanopoulos (1961); Hermann (1962); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

Malalas reports: “In that year Corinth in Hellas also suffered; and the emperor graciously gave much there too”.

ἐν δὲ τῷ αὐτῷ χρόνῳ καὶ ἡ Κόρινθος τῆς Ἑλλάδος ἔπαθε· καὶ πολλὰ κακεῖ ἐχαρίσατο ὁ αὐτὸς βασιλεύς.

In his account, Malalas conflates the Corinth and Dyrrachium (see entry <200>) earthquakes, both of which occurred in the same year during the reign of Justin (518-527). The two places are so far apart that there must in fact have been two separate earthquakes, though the sources record them together, and provide a single description of both of them.

Theophanes records the same information, and places the earthquake in the year of the world 6014 [521/522]. Cedrenus dates the earthquake to the fourth year of the reign of Justin, i.e. 521/522. Pseudo-Dionysius of Tellmahre wrongly gives the date as 529/530. James of Edessa seems to make reference to this earthquake, though the context is unclear (see entry <226> below), and he dates it to before the fifth year of Justin's reign.

Meyer (1979, under the entry "Olympia") attributes the destruction of the temple of Zeus at Olympia to this earthquake.

<202> 523-525 ●Anazarbus

- sources 1 Mal. 418; Procop. *anecd.* 18.41-2; Evagr. 4.8
sources 2 [Dion. Tellmahr.] 53; Theoph. 171; Cedren. 639; Zon. 2.60
literature Evangelatou-Notara (1987-88)
catalogues Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Capelle (1924); Grumel (1958); Hermann (1962); Guidoboni (1989)

Malalas records: "In the next year [522/523] Anazarbus, a city in Cilicia, suffered its fourth calamity from the wrath of God. The emperor restored it".

Ἐν δὲ τῷ μεταξὺ χρόνῳ ἔπαθεν ὑπὸ θεομηνίας Ἀνάζαρβος, πόλις τῆς Κιλικίας τὸ τέταρτον αὐτῆς πάθος· ἀνήγειρε δὲ αὐτὴν ὁ αὐτὸς βασιλεύς.

For a discussion of the Procopius' evidence, see the entry below.

Evagrius adds that the city was renamed Justinopolis.

Theophanes records the earthquake as follows: "In this year [6017, i.e. 524/525] Anazarbus, in lower Cilicia, was subjected to a very violent earthquake when it was governed by Calliopius, son of Irenaeus, and the whole city was reduced to ruins. Justin rebuilt it and called it Justinopolis".

Τούτῳ τῷ ἔτει Ἀνάζαρβος, μητρόπολις τῆς δευτέρας Κιλικίας, ἔπαθεν ὑπὸ σεισμοῦ φοβερωτάτου, ἡγεμονεύοντος αὐτῆς Καλλιπίου, υἱοῦ Εἰρηναίου, καὶ ἐπτώθη πᾶσα ἡ πόλις. ταύτην δὲ Ἰουστῖνος ἀνήγειρε καὶ Ἰουστινούπολιν ἐκάλεσεν.

Cedrenus dates the earthquake to the seventh year of the reign of Justin, i.e. 525. Pseudo-Dionysius of Tellmahre wrongly dates it to 530/531.

<203> mid-day on 20/29 May 526 ●Antioch, ●Seleucia Pieria

- sources 1 Mal. 419-20; Procop. *bell.* 2.14.6; *anecd.* 18.41-2; Marcell. Com. 102.19-24; *Chron. Edess.* 11-2; Ioh. Eph. 299-301; Evagr. 4.5; Zach. Mityl. 8.2; 8.4; 8.7; The Great Chronogr. 4; Ioh. Nik. 90.24 (p.151 [271]/384 [504] Zotenberg = p.135 Charles); [Dion. Tellmahr.] 49-52; Theoph. 172-3
sources 2 *Chron.* 819 9; Georg. Mon. 628; Elias Nisib. 119; Leo Gramm. 123; Cedren. 640-1; Mich. Syr. 272-3; Glyc. 266; *Chron.* 1234 191, 194
catalogues Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a); Downey (1955); Grumel (1958); Hermann (1962); Ben-Menahem (1979); Guidoboni (1989)

This is one of the most important earthquakes in the history of Byzantium. Historians have recorded only some of the evidence (see Downey 1955, p.597; Grumel 1958, p.478; Hermann 1062, col.1110), and seem to have underestimated the value of non-Greek authors, especially the Syriac ones. We have here indicated all available sources.

Many sources record a disastrous earthquake at Antioch, which was followed by a great fire and caused thousands of deaths.

Malalas is a contemporary source, and dates the earthquake to the month of May in the seventh year of the reign of Justin: the year when Olybrius was consul. This dating is self-contradictory, however, because the seventh year of the reign of Justin was 525, whereas Olybrius was consul in 526. This is confirmed by Marcellinus, as we shall see. Malalas writes: "In the seventh year of his [Justin's] reign, in the month of May, Antioch the Great suffered its fifth calamity from the wrath of God, during the consulship of Olybrius. Great was the fear of God that occurred then, in that those caught in the earth beneath buildings were incinerated and sparks of fire appeared out of the air and burned anyone they struck like lightning. The surface of the earth boiled and foundations of buildings were struck by thunderbolts thrown up by the earthquakes and were burned to ashes by fire, so that even those who fled were met by flames. It was a tremendous and incredible marvel, with fire belching out rain, rain falling from tremendous furnaces, flame dissolving into showers, and showers kindling like flames consumed even those in the earth who were crying out. As a result Antioch became desolate, for nothing remained apart from some buildings beside the mountain. No holy chapel or monastery or other holy place remained which had not been torn apart. Everything had been utterly destroyed. The great church at Antioch, which had been built by the emperor Constantine the Great, stood for seven days after this tremendous threat from God, when everything else had collapsed during the wrath of God. Then it too was overcome by fire and razed to the ground. Similarly, other houses which had not collapsed through the divine calamity were destroyed to their foundations by fire. In this terror up to 250,000 people perished. For this was the great festival of the Ascension of Christ our God and a great throng of visitors had come to town. During the wrath of God it became clear what a great number of citizens there was. Many of those who had been buried in the earth survived to be brought up alive, but then died".

Τῷ δὲ ἐβδόμῳ ἔτει τῆς αὐτοῦ βασιλείας ἔπαθεν ὑπὸ θεομηνίας Ἀντιόχεια ἡ μεγάλη τὸ πέμπτον αὐτῆς πάθος ἐν μηνὶ μαίῳ, ὑπατείας Ὀλυβρίου· πολὺς γὰρ ἦν ὁ φόβος ὁ τοῦ θεοῦ γενόμενος κατ' ἐκείνον τὸν καιρὸν, ὥστε τοὺς συλληφθέντας ὑπὸ τῶν οἰκημάτων ἐν τῇ γῇ καὶ πυρκαϊστοὺς γενέσθαι, καὶ ἐκ τοῦ ἀέρος δὲ σπινθήρας πυρὸς φαίνεσθαι· καὶ ἔκαιον ὡς ἀπὸ ἀστραπῆς τὸν εὐρισκόμενον, καὶ ἐκόχλαζε τὸ ἔδαφος τῆς γῆς, καὶ ἐκεραυνοῦντο οἱ θεμέλιοι, κουφιζόμενοι ὑπὸ τῶν σεισμῶν καὶ ὑπὸ τοῦ πυρὸς τεφρούμενοι, ὥστε καὶ τοῖς φεύγουσιν ὑπὴντα τὸ πῦρ. καὶ ἦν ἰδεῖν θαῦμα φοβερὸν καὶ παράδοξον, πῦρ ἐρευγόμενον ὄμβρον, ὄμβρος καμίνων φοβερῶν, φλόξ εἰς ὑετὸν λυομένη, καὶ ὑετὸς ὡς φλόξ ἐξαπτόμενος καὶ τοὺς βοῶντας ἐν τῇ γῇ κατανήλινκε. καὶ ἐκ τούτου Ἀντιόχεια ἄχρηστος ἐγένετο· οὐκ ἔμεινε γάρ, εἰ μὴ τὰ πρὸς ὄρος μόνον παροικούμενα οἰκήματα. οὐκ ἔμεινε δὲ οὔτε ἅγιος οἶκος εὐκτηρίου ἢ μοναστηρίου ἢ ἄλλου ἁγίου τόπου ἀδιάρρηκτος· τὰ γὰρ ἄλλα συνετελέσθησαν εἰς τὸ παντελές· ἡ δὲ μεγάλη ἐκκλησία Ἀντιοχείας ἡ κτισθεῖσα ὑπὸ Κωνσταντίνου τοῦ μεγάλου βασιλέως· τῆς θεομηνίας γενομένης καὶ πάντων πεπτωκότων εἰς τὸ ἔδαφος ἔστη ἐπὶ ἡμέρας β' μετὰ τὸ γενέσθαι τὴν τοῦ θεοῦ φοβερὰν ἀπειλήν· καὶ αὕτη ὑπὸ πυρὸς ληφθεῖσα κατηνέχθη ἕως ἐδάφους. καὶ ἕτεροι δὲ οἴκοι μὴ πεπτωκότες ὑπὸ τοῦ πάθους τοῦ θεικοῦ ὑπὸ τοῦ πυρὸς διελύθησαν ἕως θεμελίων. καὶ ἀπώλοντο ἐν αὐτῷ τῷ φόβῳ ἄχρι χιλιάδων διακοσίων πεντήκοντα. ἦν γὰρ ἡ μεγάλη ἑορτὴ Χριστοῦ τοῦ θεοῦ ἡμῶν ἡ τῆς ἀναλήψεως· καὶ πολὺ πλῆθος ἦν τῶν

Σεισμοὶ δὲ Ἀντιόχειάν τε καθεῖλον τὴν τῆς ἐώας πρώτην καὶ Σελεύκειαν, ἥπερ αὐτῆς ἐκ γειτόνων οἰκεῖται, καὶ τὴν ἐν Κίλιξιν ἐπιφανεστάτην Ἀνάξαρρον. αἷς τῶν ξυναπολωλότην ἀνθρώπων τὸ μέτρον τίς ἂν διαριθμεῖσθαι δυνατὸς εἴη; προσθεῖη δὲ ἂν τις τὰ τε Ἰβωρα καὶ Ἀμάσειαν, ἥ πρώτη ἐν Πόντῳ ἐτύγχανεν οὔσα, Πολύβοτόν τε τὴν ἐν Φρυγίᾳ καὶ ἦν Πισίδαι Φιλομηδὴν καλοῦσι, Λύχνιδόν τε τὴν ἐν Ἑπειρώταις καὶ Κόρινθον, αἱ δὴ πολυανθρωπόταται ἐκ παλαιοῦ ἦσαν.

John of Nikiu records: "... there came an earthquake from God and fire fell from heaven on the city of Antioch, extending from the church of St.Stephen to the house of the chief of the army, in breadth and length, and as far as the bath called Taynādonhus and the bath of the Syrian nation".

Pseudo-Dionysius of Tellmahre dates the earthquake to 525 and gives John of Antioch (6th century) as his source, but there is nothing about this earthquake in any of his fragments. The former also records (p.50) that “on the third day of the collapse, which was a Sunday, a cross of light appeared in the western quarter of the sky”.

He also records the sorrow felt by Justinian over the earthquake, and the measures he took towards reconstruction and to bring out the bodies from the ruins.

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crown and imperial robes, and, dressed in dirty rags, he wept for many days, and even on feast days he entered the temple in wretched garments, for he could not bear to wear any symbols of power. And all those who were in the city gathered in their rags from all parts in the countryside about 7 miles [c.10 km] outside the city, and for seven days they fasted and prayed. The emperor sent 50 gold *centenaria* and skilled men for clearing up and rebuilding work, for he was anxious to rebuild the ruined city of Antioch. During his reign it was also decreed that we should celebrate the feast of Hypapanta, which had not previously been celebrated. But the city of Pompeiopolis in Mysia was also destroyed, and the centre was swallowed up with its inhabitants, and men who were buried under the earth begged for mercy”.

Γέγονε δὲ καὶ σεισμὸς φοβερώτατος, ὑφ’ οὗ τῇ μὲν Κωνσταντινουπόλει ἐν διαφόροις τόποις, τῇ δὲ Ἀντιοχείᾳ συμφορὰ ἀνεκδιήγητος προεμηνύθη. τῇ γὰρ τετάρτῃ τοῦ ὀκτωβρίου μηνὸς τὰ προοίμια τῆς τοῦ θεοῦ ὀργῆς ἐπῆλθεν αὐτῇ δι’ ἐμπρησμῶν καὶ σεισμῶν, ὃς ἐμπρησμός μεσον τῆς πόλεως ἐγένετο, καὶ ἐκράτησε ἐπὶ ἡμέρας σ’. καὶ ἐκάησαν οἶκοι πολλοὶ, καὶ ἀπέθανον λαοὶ πολλοί, καὶ οὐδεὶς ἔγνω πόθεν τὸ πῦρ ἀνάπτεται· τοσοῦτον γὰρ ἡ ὀργὴ τοῦ θεοῦ ἐπῆλθεν ἐπ’ αὐτῇ ὥστε πτωθῆναι σχεδὸν πᾶσαν τὴν πόλιν καὶ τάφον τῶν οἰκητόρων γενέσθαι. τινὰς δὲ καταχωσθέντας καὶ ἐτιζῶντας ὑπὸ τὴν γῆν πῦρ ἐξελθὼν ἐκ τῆς γῆς κατέφλεξε. καὶ ἕτερον πῦρ ἐκ τοῦ ἀέρος ὡς σπινθήρες κατέρχετο καὶ κατέκαιεν ὥσπερ ἀστραπὴ τοὺς εὐρισκομένους. ἐσειέτο δὲ ἡ γῆ ἐπ’ ἐνιαυτὸν ἓνα. τῷ θ’ ἔτει τοῦ σειсмоῦ ἐπικρατοῦντος Εὐφράσιος ὁ ἐπίσκοπος Ἀντιοχείας ὑπὸ τοῦ σειсмоῦ κατεχώσθη καὶ ἀπέθανε, καὶ πᾶς οἶκος καὶ ἐκκλησία κατέπεσε, καὶ τὸ κάλλος τῆς πόλεως ἠφανίσθη· οὐ γὰρ γέγονε τοιαύτη θεομηνία ἐν ἄλλῃ πόλει ἐν πάσαις ταῖς γενεαῖς. πολλὰς μὲν οὖν ἀνδρῶν καὶ γυναικῶν μυριάδες, πολλὰς δὲ παίδων καὶ νεογνῶν ἐν λόφου τάξει ἢ τῶν κατενεχθέντων οἰκοδομημάτων ὕλῃ καλύπτουσα [...] καὶ τέλος τοῦτο τὴν οὕτως ὀνομαστότατην καὶ εὐχαριν ἔλαβε πόλιν, ἥνπερ ἐπὶ ὀκτακοσίους ἐνιαυτοὺς συστάσαν ἐξ οὐπὲρ αὐτὴν Σέλευκος ὁ πρῶτος ἔκτισεν, ἐπὶ τῇ προσηγορίᾳ τοῦ πατρὸς αὐτοῦ Ἀντιόχειαν ἐκάλεσεν. ἀγγελθέντος δὲ τοῦ πάθους ὁ μὲν βασιλεὺς μεγάλως ἠλγησε τὴν ψυχὴν, καὶ ρίψας τὸ διάδημα καὶ τὴν πορφύραν ἐπένθει ἐν σάκκῳ καὶ σποδῷ ἡμέρας πολλὰς, καὶ ἐν τῇ ἑορτῇ δὲ λιτῶς εἰσῆλθεν εἰς τὴν ἐκκλησίαν, μὴ καταδεξάμενος φορέσαι σήμαντρον βασιλικὸν τὸ οἰονοῦν. ἀλλὰ καὶ πάντες οἱ ἐν τῇ πόλει φαῖαν στολὴν ἐνδυσάμενοι πανδημεὶ εἰς τὸ πρὸ τῆς πόλεως πεδῖον ἐπτά σημείοις ἀπέχον ἐπὶ ἐπτά ἡμέραις ἐλιτάνευον νηστεύοντες. ὁ δὲ βασιλεὺς ἀπέστειλεν εἰς ἐκχοισμόν καὶ ἀνακαινισμόν τῆς πόλεως χρυσοῦ κεντηνάρια πεντήκοντα καὶ ἀνδρας μηχανικοὺς, καὶ ἦν αὐτῷ σπουδὴ τοῦ τὴν πεσοῦσαν πόλιν Ἀντιόχειαν ἀνακαινίσαι. ἐπὶ αὐτοῦ δὲ ἐτυπώθη ἑορτάζειν ἡμᾶς καὶ τὴν ἑορτὴν τῆς ὑπαπαντῆς τῆς μέχρι τότε μὴ ἑορταζομένης. ἀλλὰ καὶ ἡ Πομπηιοῦπολις τῆς Μυσίας διαρραγεῖσα μέσον κατεπόθη μετὰ τῶν οἰκητόρων, καὶ ἔκραζον ὑπὸ τὴν γῆν ὄντες οἱ ἄνθρωποι τὸ ἐλεήσατε.

Glycas is probably following Cedrenus when he records that there was an earthquake at Constantinople, Antioch in Syria and Pompeiopolis during the reign of Justin: “After Anastasius, Justin the Thracian reigned for nine years. During his reign a star appeared in the heavens above the golden gate of the palace for twenty-six days, and there was a very violent earthquake, and buildings collapsed in many parts of the city of Constantinople, and the great city of Antioch was almost completely swallowed up and became a tomb for its inhabitants. Fire from within the earth burned those who were still alive. Pompeiopolis, too, was half destroyed. Half of the city was swallowed up with its inhabitants. And the earth shook for a whole year”.

Μετὰ δὲ Ἀναστάσιον Ἰουστίνος ὁ Θράξ ἔτη θ’. ἔφ’ οὗ ἀστὴρ ἐφάνη ἐν τῷ οὐρανῷ ἐπάνω τῆς χαλκῆς πύλης τοῦ παλατίου, ἐπὶ ἡμέρας κς’, καὶ γέγονε σεισμὸς φοβερώτατος. καὶ ἡ μὲν Κωνσταντινούπολις ἐν διαφόροις τόποις συμπτώσεις ὑπέμεινε,

ἡ δὲ μεγάλη Ἀντιόχεια πᾶσα σχεδὸν κατεπόθη καὶ τάφος τῶν οἰκητόρων ἐγένετο· τοὺς δὲ ἔτι ζῶντας πῦρ κάτωθεν ἀνερχόμενον κατέφλεγεν. ἡ δὲ Πομπηιοῦπολις μέσον ἐρράγη, καὶ τὸ ἥμισυ αὐτῆς κατεπόθη μετὰ τῶν οἰκητόρων. ἐσείετο δὲ ἡ γῆ ἐνιαυτὸν ὅλον.

Both Glycas and Cedrenus relate this earthquake to the disaster at Pompeiopolis in Moesia (see entry <205>), but the latter seems to have occurred in 536, and in any case, Pompeiopolis was a long way away. The mistake probably resulted from a misunderstanding of Malalas 456 (see entry <209>), where a strong but not destructive tremor is recorded at Antioch.

The *Syriac Chronicle of 1234* dates the earthquake to “the seventh year of the reign of Justin II [Justinian = 532]”, but considers it to have been the fifth earthquake in that city. Since this text records another earthquake at Antioch two years later, it is clear that sources referring to an earthquake in 532 are basing their reports on a mistaken chronology, and that the earthquake they are referring to is on fact the one which occurred in 526.

According to John of Ephesus: “In the seventh year of the reign of Justinian [i.e. Justin I], namely the year 837 [of the Greeks; i.e. 525-526 AD.], the great city of Antioch collapsed for the fifth time. At the seventh hour of the day there was a collapse so tremendous and violent that nobody could tell. For the anger of heaven was so severe and violent that those who escaped from the terrible violence of the wrath of the earthquake and of the collapse were kindled by the fire and burned; and sparks flew and burned everything on which they landed. The earth itself was churned up under the dust; and it grew hot and burned everything it encountered. And so the foundations of buildings, with all the storeys above them, were thrown up: they were lifted and collapsed back down again; they cracked, were cast down, fell to the ground and were consumed by the fire. And those who survived and tried to flee, the fire caught them, ignited them and burned them like pieces of wood. And the tongues of flame burned terribly and cruelly because of God’s intense anger. And indeed the fire came down from the sky like rain. So the whole city was burning like a fiery furnace, and then it was demolished, collapsed in ruins and was consumed by the fire, except only for a few houses which survived at the foot of the mountain above the city, but they too split open and were in danger of collapse. Every day houses collapsed and burned those who had remained in them. Every house or church or building of any kind cracked, split open and collapsed in ruins, even to garden fences; and the rest burned to smouldering ashes and was scattered in the wind. Moist dust bubbled up from the depths of the earth, and the sea gave off a great stench; and the dust could be seen bubbling up in the water as it threw up sea shells.

The great church built by the emperor Constantine the Victorious — said to be greater than any other in the Roman Empire — had remained standing although cracked. But suddenly, on the seventh day, the fire caught it too from top to bottom, and it collapsed and lay smouldering on the ground. And the same thing happened to all the other churches which somehow or other escaped collapse in the tremor; in the end they were burned by the sudden fire of heavenly anger and collapsed to the ground. As John of Antioch wrote, the souls perished and were destroyed in the city of Antioch which was like a winepress of anger for all its inhabitants. As if those who survived could count those who had died, those who had fled and those who were in the city, they were assessed at 1250, for it was a feast day and therefore the city was crowded with people. On the third day of the collapse — which was a Sunday — a cross of light was seen in the western part of the sky; and all those who had survived saw it and were amazed; they cried out ‘Kyrie eleison’, beholding it for about an hour. Then it was hidden by the clouds and everyone was amazed. Afterwards, the mercy and grace of God was made manifest as follows: thirty or forty days later, men, women, youths and children

together into a single year. Thus Cedrenus' narrative mentions the episode of the death of bishop Euphrasius, and our earlier argument suggests that he died in the earthquake of 526.

As regards Constantinople, it seems reasonable to suggest that if it had suffered a destructive earthquake, contemporary sources would have noted the fact. Their silence on the matter leads us to believe, therefore, that the late chroniclers have confused this earthquake with another one: perhaps the November 533 earthquake reported by Malalas and the *Chronicon Paschale*, or the 543 earthquake, if they misinterpreted Theophanes. As regards Pompeiopolis in Moesia, it seems likely that the late sources got their information from Malalas (436.17ff.) and Theophanes (216.17), both of whom record an earthquake at Pompeiopolis somewhere between 527 and 536. Hermann (1962, col.1110) dates the earthquake to 525, and adds another one in 527 at Seleucia, basing himself on Cedrenus (640.10-641.20). Grumel (1958, p.478) uses Cedrenus to show that an earthquake on 4 October 525 caused damage at Antioch, Seleucia in Syria, and Constantinople. In actual fact, the Antioch and Seleucia earthquake occurred in 526 (see entry (203) above).

Downey (1955, p.597) also locates the earthquake at Constantinople and Antioch. On the authority of Cedrenus and the *Synaxarium Ecclesiae Constantinopolitanae* 116.45-117.3, he dates the earthquake to somewhere between 4 and 7 October 525, the year being provided by Cedrenus. On the basis of Zonaras and Glycas, Downey places a second earthquake at Constantinople, Nicomedia and Nicea in 526, and a third at Antioch in May 526. We do not think there are sound reasons for accepting these hypotheses.

(205) **527 ●Lychnidus?, ●Pompeiopolis ▷subsidence◁**

- sources 1 Mal. 436-7; Procop. *anecd.* 18.41-2; Ioh. Eph. 299-301; Theoph. 216
sources 2 The Great Chronogr. 5; [Dion. Tellmahr.] 71; Georg. Mon. 626; Leo Gramm. 123; Cedren. 640-1;
Zon. 14.5.41; Mich. Syr. 278, 308; Glyc. 266
literature Honigmann (1952); Whitby and Whitby (1989)
catalogues Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Capelle (1924); Grumel (1958);
Shebalin *et al.* (1974); Guidoboni (1989)

Malalas writes as follows: "In that year [528/529] Pompeiopolis in Mysia suffered from the wrath of God. When the earthquake occurred, the ground suddenly split open and half the city with its inhabitants was swallowed up. They were beneath the ground and the sound of their voices was carried to the survivors. The emperor made many benefactions for excavations to rescue those beneath the ground, and equally to those left alive and to the city for its reconstruction".

Ἐν αὐτῷ δὲ τῷ χρόνῳ ἔπαθεν ὑπὸ θεομηνίας ἐν τῇ Μυσίᾳ Πομπηίουπολις· τῆς γὰρ κινήσεως γενομένης ἐξαίφνης ἐσχίσθη ἡ γῆ καὶ ἐχάωθη τὸ ἥμισυ τῆς πόλεως μετὰ τῶν οἰκούντων, καὶ ἦσαν ὑπὸ τὴν γῆν, καὶ τὸ ἦχος αὐτῶν ἐφέρετο τοῖς περισωθεῖσι. καὶ πολλὰ ἐφιλοτιμήσατο ὁ αὐτὸς βασιλεὺς εἰς τὴν ἐκχόισιν τοῦ περισωθῆναι τοὺς ὄντας ὑπὸ τὴν γῆν, ὡσαύτως δὲ καὶ τοῖς ζήσασι καὶ τῇ πόλει εἰς ἀνανέωσιν.

Theophanes records: "In this year [6028, i.e. 536]: Pompeiopolis, a city in Mysia, was subjected to the wrath of God. The earth was split open by the tremor, and half the city was swallowed up with its inhabitants. They were left buried, and one could hear the voices of those who cried out for help. The emperor gave large sums to rescue and succour them, and he rewarded the survivors".

Τούτῳ τῷ ἔτει ἔπαθεν ὑπὸ θεομηνίας Πομπηίουπολις τῆς Μυσίας. ἐσχίσθη γὰρ ἡ γῆ ὑπὸ τοῦ σεισμοῦ, καὶ ἐχάωθη τὸ ἥμισυ τῆς πόλεως μετὰ τῶν οἰκητόρων. καὶ ἦσαν

ὑπὸ τὴν γῆν, καὶ αἱ φωναὶ αὐτῶν ἠκούοντο βοῶντων ἐλεθῆναι. καὶ πολλὰ ἐδωρήσατο ὁ βασιλεὺς πρὸς τὸ ἐκχοηθῆναι καὶ βοηθηθῆναι αὐτοὺς, καὶ τοὺς ζήσαντας ἐφιλοτιμήσατο.

The city of Pompeiopolis was situated about 35.5 km north of Nish in former Yugoslavia. The city was formerly thought to be in *Mysia*, a province of Asia Minor (Whitby and Whitby 1989, p.195 note 6, take this view); but in fact Byzantine sources use that term to indicate the province of Moesia in the Balkans. The sources are discussed in Honigsmann (1952).

Theophanes gives us a date for the earthquake, using Malalas as his source. The latter, however, does not give an exact date: he simply states that the earthquake occurred during the reign of Justinian [527-565], taking as a point of reference the year 529, in which the *Corpus Iuris* was published. A reasoned analysis of the relevant passages in Malalas, however, which are always in chronological order, shows that the earthquake occurred earlier than this, perhaps in the year of the death of Justin I [527]. Justin I is in fact mentioned by the later chroniclers, from Georgius Monachus to Cedrenus and Glycas. Furthermore, John of Ephesus and Pseudo-Dionysius of Tellmahre give the date as 538/539, but the latter's chronology is unreliable. Indeed, he records this earthquake shortly before mentioning the one at Antioch in 528 (see entry <206>), which he wrongly dates to 539-540. And Michael the Syrian gives the earthquake a doublet and provides two separate dates.

We think it likely that this is the same earthquake as that recorded by Procopius in relation to “Lychnidus in Epirus” (see entry [〈203〉](#) above).

According to John of Ephesus (*Anecd. Syr.*, II, p.299-301): "In the year 850 [of the Greeks; i.e. 538-539 AD.], the city of Pompeiopolis was suddenly struck. This Pompeiopolis collapsed in the severe earthquake which took place, not like the other cities, but there was a terrible sign: when the earth suddenly split open, it was rent from one end of the city to the other, and so one part of the city went down into that terrible and dreadful chasm and was swallowed up with its inhabitants; it disappeared alive into the Sheol, as it is written. And when the people went down into that terrible and dreadful chasm and were swallowed up by the depths of the earth, the bitter and horrible sound of all their cries rose up from the earth for many days to those who had survived, as their souls were tormented by the sound of their cries from the depths of the Sheol, but there was nothing they could do to help them".

[illegible]

〈206〉 29 November 528 ●Antioch, ●Laodicea (Syria)

sources 1 Mal. 442-3; Ioh. Ephes. 301-2; Evagr. 4.6; The Great Chronogr. 4; Theoph. 177-8

sources 2 [Dion. Tellmahr. 72-5]; Georg. Mon. 643; Cedren. 646; Mich. Syr. 278-80, 308; Glyc. 269; *Chron.* 1234 194

literature Downey (1961); Whitby and Whitby (1989)

catalogues Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Capelle (1924); Sieberg (1932 a); Grumel (1958); Ben-Menahem (1979); Guidoboni (1989)

Scarcely more than two years after the disastrous earthquake of May 526, Antioch was struck by another, which destroyed both the new buildings put up after the previous one, and those old buildings which had survived it. Malalas describes what happened as follows: "It was at that time [528/529] that Antioch suffered its sixth calamity from the wrath of God. The earthquake that now occurred lasted for one hour and was accompanied by a terrible roaring sound, so the buildings that had been reconstructed after the former shocks collapsed; as did the walls and some of the churches. When the other cities heard what had happened, they all held processions of prayer in mourning. Parts of the area around the city also suffered. Up to 5,000 lives were lost in this earthquake. The surviving citizens fled to the other cities, but a number of them went to live in the mountains. The patriarch Euphraimius reported all these events to the emperor, and when the people at Byzantium heard what had happened, they held processions of prayer for a considerable number of days".

Συνέβη δὲ ἐν αὐτῷ τῷ καιρῷ ὑπὸ θεομηνίας παθεῖν Ἀντιόχειαν τὸ ἕκτον αὐτῆς πάθος. Ὁ δὲ γεγωνὴς σεισμὸς κατέσχευεν ἐπὶ μίαν ὥραν, καὶ μετὰ τούτου βρυγμὸς φοβερός, ὥστε τὰ ἀνανεωθέντα κτίσματα ὑπὸ τῶν πρώην γενομένων φόβων καταπεσεῖν καὶ τὰ τεῖχη καὶ τινὰς ἐκκλησίας. Τὰ δὲ συμβάντα ἠκούσθη καὶ ἐν ταῖς ἄλλαις πόλεσι, καὶ πᾶσαι πενθοῦσαι ἐλιτάνευον. Ἔπαθε δὲ καὶ μέρη τῶν περὶ τῆς πόλεως τελευτῶσι δὲ ἐν αὐτῷ τῷ σεισμῷ ἄχρι ψυχῶν πεντακισχιλίων. Οἱ δὲ περισωθέντες πολῖται εἰς τὰς ἄλλας πόλεις, φανεροὶ δὲ ἐν τοῖς ὄρεσιν ὄκουν. Ὁ δὲ πατριάρχης Εὐφραΐμιος πάντα τὰ γεγόμενα ἀνήγαγε τῷ βασιλεῖ καὶ ἀκούσαντες οἱ ἐν τῷ Βυζαντίῳ τὰ συμβάντα ἐλιτάνευον ἐπὶ ἡμέρας ἱκανάς.

Malalas also describes the effects of the earthquake at Laodicea in Syria: "In that year Laodicea suffered its first earthquake disaster. Half the city was brought down by the shock, including the Jewish synagogues, and 7,500 people perished: a large number of Jews and a few Christians. The city churches remained intact, being preserved by God. The emperor bestowed two *centenaria* upon the people of Laodicea to excavate their city".

Ἐν δὲ τῷ αὐτῷ χρόνῳ συνέβη παθεῖν ὑπὸ σεισμοῦ Λαοδικεῖαν τὸ πρῶτον αὐτῆς πάθος· κατηνέχθη δὲ ὑπὸ τοῦ φόβου τὸ ἥμισυ τῆς αὐτῆς πόλεως καὶ αἱ συναγωγαὶ τῶν Ἰουδαίων. ἀπώλοντο δὲ ἐν αὐτῷ τῷ φόβῳ χιλιάδες ἑπτὰ ἥμισυ, Ἑβραίων τὸ πλεονέκτος καὶ χριστιανῶν ὀλίγοι· αἱ δὲ ἐκκλησίαι τῆς αὐτῆς πόλεως ἔμειναν ἀρραγεῖς, περισωθεῖσαι ὑπὸ θεοῦ. Ὁ δὲ αὐτὸς βασιλεὺς ἐχαρίσατο τοῖς Λαοδικεῦσιν εἰς ἐκχοίσιν τῆς αὐτῶν πόλεως κεντηνάρια δύο.

Even though the surviving text of Malalas does not specifically mention an earthquake at Seleucia, immediately after reporting what happened at Antioch and Laodicea, he writes: "This too was reported to the emperor Justinian, and in his munificence he allowed the people of Antioch, Laodicea and Seleucia exemption from taxes for three years".

καὶ ἀνενέχθη ταῦτα τῷ αὐτῷ βασιλεῖ Ἰουστινιανῷ. καὶ ἐδωρήσατο θεῖαν φιλοτιμίαν τοῖς Ἀντιοχεῦσι καὶ Λαοδικεῦσι καὶ Σελευκέσιν, ὥστε κουφισθῆναι τὴν αὐτῶν συντέλειαν ἐπὶ ἔτη τρία.

Justinian also granted these towns two hundred *librae*, and raised the status of the inhabitants.

John of Ephesus seems to use the original text of Malalas as his source, but dates the Antioch earthquake to 29 November 539.

There is a similar account in Pseudo-Dionysius of Tellmahre, who dates the earthquake to 539/540 as a result of general chronological confusion (see entry (205)).

Michael the Syrian's account is substantially the same.

Theophanes refers to an earthquake at Antioch in Syria on 29 November in the year of the world 6021 [528]: "On 29 November in that same year, at the third hour of the fourth day [Wednesday] in the seventh indiction, Antioch the Great was again subjected to the wrath of God, two years after its first disaster: there occurred a violent earthquake which lasted for a whole hour, and a frightening roar came from the heavens. All the city's buildings and walls collapsed in ruins, including the old buildings which had survived the previous earthquake. All the magnificence with which the city had been invested through acts of generosity by the emperor and through the buildings erected by the citizens at their own expense was all destroyed. When they heard of the disaster, the outlying cities reacted with prayers and lamentations. Four thousand eight hundred and seventy people died in this disaster. Survivors fled to nearby cities or into the mountains, where they lived in hovels. Then there came a terrible, very severe winter. All those who had remained in the city prayed in their bare feet, weeping and throwing themselves down in the snow and crying: 'Have mercy, O Lord'. Then He appeared to a pious man, who told all the survivors to write at the top of their doors: 'Christ is with us. Stop'. When this was done, the wrath of God abated. Once again, the emperor and his consort gave great riches for the restoration and rebuilding of the city of Antioch, which changed its name to Theopolis".

Τῷ δ' αὐτῷ ἔτει μηνὶ νοεμβρίῳ κθ', ὥρα γ', ἡμέρα δ' ἰνδικτιῶνος ζ' ἔπαθεν ὑπὸ θεομηνίας πάλιν Ἀντιόχεια ἡ μεγάλη μετὰ δύο ἔτη τοῦ πρώτου αὐτῆς πάθους. καὶ ἐγένετο σεισμὸς μέγας ἐπὶ ὥραν μίαν, καὶ ἐγένετο βρυγμὸς ἐκ τοῦ οὐρανοῦ φοβερός· καὶ ἔπεσον πάντα τὰ κτισθέντα ἕως ἐδάφους καὶ τὰ τεῖχη, καὶ ἐκ τῶν μὴ πεσόντων παλαιῶν κτισμάτων ἐν τῷ πρώτῳ σεισμῷ κατηνέχθησαν νῦν· καὶ πᾶσα ἡ εὐπρέπεια, ἡ γενομένη ἐν τῇ πόλει ἐκ τε τῶν τοῦ βασιλέως φιλοτιμιῶν καὶ ὧν ἐξ ἰδίων οἱ πολῖται ὠκοδόμησαν, πάντα κατέπεσον. ταῦτα μαθοῦσαι αἱ πλησιάζουσαι πόλεις μετὰ πένθους ἐλιτάνευον. ἀπέθανον δὲ καὶ ἐν ταύτῃ τῇ πτώσει χιλιάδες τέσσαρες καὶ ὀκτακόσιοι ἐβδομήκοντα. οἱ δὲ σωθέντες ἔφυγον εἰς τὰς ἄλλας πόλεις καὶ εἰς τὰ ὄρη ἐν καλύβαις ὄκουν. γέγονε δὲ καὶ χειμὼν μέγας καὶ βαρύντατος· καὶ ἐλιτάνευον οἱ ἀπομείναντες πάντες ἀνυπόδητοι, κλαίοντες καὶ ρίπτοντες ἑαυτοὺς πρηνεῖς εἰς τὰς χιόνας, κράζοντες τὸ "Κύριε ἐλέησον." ἐφάνη δὲ ἐν ὁράματι τινὶ θεοσεβεῖ ἀνθρώπῳ, ὥστε εἰπεῖν πᾶσι τοῖς ὑπολειφθεῖσιν, ἵνα ἐπιγράψωσι εἰς τὰ ὑπέρθυρα αὐτῶν "Χριστὸς μετ' ἡμῶν στήτε." καὶ τούτου γενομένου ἔστη ἡ ὀργὴ τοῦ θεοῦ. καὶ πάλιν ὁ βασιλεὺς καὶ ἡ αὐγούστα πολλὰ ἐδωρήσαντο χρήματα εἰς ἀνανέωσιν καὶ οἰκοδομὴν τῆς Ἀντιοχείας πόλεως· καὶ μετωνόμασεν αὐτὴν Θεούπολιν.

The Great Chronographer records: "In the time of Justinian, Antioch the Great again suffered an earthquake from divine wrath, two years after the occurrence of the first earthquake. The earthquake lasted for one hour with the result that the walls of the city and great houses fell to their foundations, and 4,000 people died as well. And a fearful roaring from the heavens occurred, as well as a terrible and most severe winter".

ὅτι ἐπὶ Ἰουστινιανοῦ ἔπαθε πάλιν ὑπὸ θεομηνίας, σεισμοῦ, ἡ μεγάλη Ἀντιόχεια μετὰ β' ἔτη τοῦ ἄλλου γεγονότος σεισμοῦ. καὶ ἐκράτησεν ὁ σεισμὸς ἐπὶ ὥραν μίαν ὥστε πεσεῖν ἕως ἐδάφους τὰ τεῖχη τῆς πόλεως καὶ οἰκίας μεγάλας, ἀποθανεῖν δὲ καὶ ἀνδρῶν χιλιάδες δ'. γέγονεν δὲ καὶ βρυγμὸς ἐκ τοῦ οὐρανοῦ φοβερός καὶ χειμὼν δεινὸς καὶ βαρύντατος.

The number of victims given is probably a round figure produced by the scribe, since both Theophanes and Cedrenus specify 4870. Another element which these sources have in common is the mention of winter (see Whitby and Whitby 1989, p.195, note 5). Evagrius simply says that Antioch was struck by an earthquake thirty months after Ephraim was made bishop of the city [527]. Pseudo-Dionysius of Tellmahre gives the date 540/541 for Laodicea.

〈207〉 **July 529 ●the Amasia area, ●Ibora, ●Philomede?, ●Polybotus?**

sources Mal. 448; Procop. *anecd.* 18.41-2

catalogues Grumel (1958); Hermann (1962); Guidoboni (1989)

Malalas records an earthquake at Amasia: "At that time [529, possibly July] it happened that Amasia in Pontus suffered from the wrath of God, as did parts of the surrounding area. The emperor [Justinian] gave generously to the city".

Συνέβη δὲ κατ' ἐκεῖνο καιροῦ παθεῖν ὑπὸ θεομηνίας Ἀμάσειαν ἐν τῇ Ποντικῇ καὶ αὐτῆς τῆς περιχώρου μέρη. ὁ δὲ αὐτὸς βασιλεὺς τῇ αὐτῇ πόλει πολλὰ ἐχαρίσατο.

What Procopius has to say (*Anecdota* 18.41-2) is more open to question (see entry 〈203〉 above), but it may also be possible to attribute to this earthquake the collapse of buildings in nearby Ibora, which he mentions along with Amasia, and perhaps Polybotus and Philomede (Philomelion) in Phrygia were involved as well. In fact what Procopius does is to list a series of earthquakes datable to between 523-525 and 543 (see entries 〈202〉, 〈203〉, 〈205〉 and 〈212〉).

Hermann (1962, col.1110) dates the earthquake to 528.

〈208〉 **530 ●Myra**

sources Mal. 448

catalogues Grumel (1958); Hermann (1962); Guidoboni (1989)

Malalas records this earthquake as follows: "In that year, Myra, the metropolis of Lycia, suffered from the wrath of God, and the emperor gave generously to the survivors and the city for building purposes".

Ἐν δὲ τῷ αὐτῷ χρόνῳ ἔπαθεν ὑπὸ θεομηνίας μητρόπολις τῆς Λυκίας τὰ Μύρα· καὶ πολλὰ ἐχαρίσατο τοῖς ὑπολειφθεῖσι καὶ τῇ πόλει εἰς κτίσματα ὁ αὐτὸς βασιλεὺς.

There is no other sources for this earthquake.

Hermann (1962, col.1110) dates the earthquake to 532 and locates it at Antioch in Syria, the confusion arising because Malalas had been speaking of Antioch in the previous paragraph (see entry 〈209〉 below).

〈209〉 **532 Antioch**

sources Mal. 456, 478

literature Downey (1961)

catalogues Schmidt (1881); Sieberg (1932 a); Downey (1955); Hermann (1962); Guidoboni (1989)

Malalas writes in general terms: "In that year there were widespread earthquakes and much time was spent in prayer in each city".

Ἐν αὐτῷ δὲ τῷ χρόνῳ ἐγένοντο σεισμοὶ κατὰ τόπον, καὶ λιταῖς ἐσχολάζον ἐν ἐκάστη πόλει.

And later on records an earthquake at Antioch which caused no damage: "Not long after [Justinian's edict for the orthodox faith, 532] a tremendous earthquake occurred at Antioch the Great but it caused no damage".

Καὶ μετ' οὐ πολὺ σεισμὸς ἐγένετο φοβερὸς ἐν Ἀντιοχείᾳ τῇ μεγάλῃ ἀβλαβής.

There is no other sources for this earthquake.

Downey (1961, p.533) dates the earthquake to between 531 and 534.

〈210〉 **a late evening in November 533 Constantinople**

sources Mal. 478; *Chron. Pasch.* 341

catalogues Mallet (1853); Capelle (1924); Downey (1955); Grumel (1958); Hermann (1962); Guidoboni (1989)

Malalas records an earthquake which struck Constantinople without mentioning any specific damage: "In that year [532?] an earthquake occurred in Byzantium late in the evening, so that the whole city gathered in the place known as the Forum of Constantine, for prayers, petitions and vigils".

Ἐν αὐτῷ δὲ τῷ χρόνῳ γέγονε σεισμός ἐν Βυζαντίῳ ἑσπέρας βαθείας, ὥστε πᾶσαν τὴν πόλιν συναχθῆναι ἐν τῷ λεγομένῳ φόρῳ Κωνσταντίνου, ἐν λιταῖς καὶ ἀγρυπνίαις συναγόμενοι.

Further on he writes: "In that year [533/534] the statue of Julian the Apostate, which had been placed in the middle of the Julian harbour, fell down. They set up a cross in its place"; but he does not state that this was caused by an earthquake.

The *Chronicon Paschale* dates the earthquake to the 328th Olympiad, in the fourth year of the sole consulship of Justinianus, in November of the twelfth indiction (i.e. 533), and reports that no damage was caused: "In this year, in the month of Dios, November according to the Romans, in the 12th indiction [533], there was a severe earthquake in Constantinople, late in the evening, but it caused no damage, so the entire city gathered in the Forum of Constantine in a procession of prayer and said, 'God is holy, holy and strong, holy and immortal, He who was crucified for us, have mercy on us'. They spent the whole night in vigil and prayer".

Τούτῳ τῷ ἔτει μηνὶ δίῳ κατὰ Ῥωμαίους νοεμβρίῳ, τῆς ιβ' ἰνδικτιῶνος, γέγονε σεισμός μέγας ἀβλαβῆς ἐν Κωνσταντινουπόλει, ἑσπέρας βαθείας, ὥστε πᾶσαν τὴν πόλιν συναχθῆναι εἰς τὸν φόρον Κωνσταντίνου καὶ λιτανεύειν καὶ λέγειν "Ἄγιος ὁ θεός, ἅγιος ἰσχυρός, ἅγιος ἀθάνατος ὁ σταυρωθεὶς δι' ἡμᾶς, ἐλέησον ἡμᾶς". καὶ ἔμειναν πᾶσαν τὴν νύκτα ἀγρυπνοῦντες καὶ εὐχόμενοι.

〈211〉 **16 August 542 •Constantinople**

sources 1 Theoph. 222; *Anon. Eccl. Hist.* 113

sources 2 Cedren. 656

literature Dagron (1974); Whitby and Whitby (1989)

catalogues Mallet (1853); Downey (1955); Grumel (1958); Shebalin *et al.* (1974);

Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

As information passes from one source to another, problems of chronology are created, and so it becomes impossible to say whether we are dealing with one earthquake or two, or with a simple dating error.

Theophanes records an earthquake on 16 August in the year of the world 6034 [542]. In the same passage, he refers to a "divine catastrophe" which again occurred at Constantinople, in the month of October in the same fifth indiction. What Theophanes wrote was: "In the month of October in that year [541], in the fifth indiction, there was a terrible disaster at Byzantium. In that same year, the feast of the Presentation of Christ in the Temple was first celebrated, on 2 February. On 16 August in the same fifth indiction [542], there was a powerful earthquake at Constantinople. Churches, houses and city walls all collapsed, especially near the Golden Gate. The spear held by the statue in the Forum of Constantine also fell down, as did the right hand of the statue at the Xerolophus. Many people died, and there was a great deal of alarm".

Τούτῳ τῷ ἔτει μηνὶ ὀκτωβρίῳ, ἰνδικτιῶνος ε΄, γέγονεν ἐν Βυζαντίῳ τὸ μέγα θανατικόν. καὶ τῷ αὐτῷ χρόνῳ ἡ ὑπαπαντὴ τοῦ κυρίου ἔλαβεν ἀρχὴν ἐπιτελεῖσθαι ἐν τῷ Βυζαντίῳ τῇ β΄ τοῦ φεβρουαρίου μηνός· καὶ τῷ αὐγούστῳ μηνὶ ις΄ τῆς αὐτῆς ε΄ ἰνδικτιῶνος ἐγένετο σεισμός μέγας ἐν Κωνσταντινουπόλει, καὶ ἔπεσον ἐκκλησίαι καὶ οἴκοι καὶ τὸ τεῖχος, μάλιστα τὸ κατὰ τὴν Χρυσήν πόρταν. ἔπεσε δὲ καὶ ἡ λόγχη, ἣν ἐκράτει ὁ ἀνδριᾶς ὁ ἐστὼς εἰς τὸν φόρον τοῦ ἀγίου Κωνσταντίνου, καὶ ἡ δεξιὰ χεὶρ τοῦ ἀνδριάντος τοῦ Ξηρολόφου· καὶ ἀπέθανον πολλοὶ, καὶ ἐγένετο φόβος μέγας.

The reference to a “divine catastrophe” may have led astray both Cedrenus and Glycas, when they locate a destructive earthquake at Constantinople on 4 October 526 (see the entry concerned). The report of this earthquake by Theophanes is not at all convincing, because the description of damage near the Golden Gate and of a spear falling from the hand of a statue in the Forum of Constantine is also found in relation to the later earthquake of 15 August 554; and the latter is confirmed by Malalas — a contemporary source.

For the 541/2 earthquake, Theophanes is probably using the same source as the *Historia ecclesiastica anonima* (edited by Cramer), and for the 554 earthquake he is probably using Malalas. Downey (1955, p.598) dates the earthquake to 542.

⟨212⟩ 543 ●Corinth

sources Procop. *anecd.* 18.41-2; *aed.* 4.2.24; Elias Nisib. *Arab. versio* 120
literature Avramea and Kirkou (1988)
catalogues Grumel (1958); Papazachos and Papazachos (1989); Guidoboni (1989)

A destructive earthquake occurred at Corinth, immediately after a serious outbreak of plague. Elias of Nisibis writes: “The year 854 [in the chronology of Andronicus; i.e. 543]. In that year there was an earthquake in the city of Corinth, which razed most of its walls to the ground”.

فيها كانت زلزلة بمدينة قورنتوس و وقع اكثر سورها

It may be worth adding that Procopius mentions Corinth as one of the cities struck by earthquakes during the reign of Justinian, and the context suggests a period between 525 and 541/542, the year of the great plague which apparently followed these disasters (see entry ⟨203⟩ above).

The only earthquake at Corinth at around this time for which we have evidence is the one that occurred in 521/522, during the reign of Justin. In the passage in question, Procopius also lists an earthquake at Anazarbus, which must also have occurred during the reign of Justin, though only shortly before Justinian ascended the throne, that is to say in 523-525 (see entry ⟨202⟩). Since Procopius seems to have listed the earthquakes in chronological order (if our attributions are correct: see entries ⟨207⟩ and ⟨205⟩), and since Corinth is the last to be listed before the plague, a comparison with the evidence provided by Elias of Nisibis suggests that the Procopius’ chronology (as frequently happens) needs to be adjusted.

We should also mention the passage in Procopius’ *De aedificiis*, in which there is mention of fortifications in Greece being rebuilt under Justinian: “For they had fallen into ruin long before, in the case of Corinth because of terrible earthquakes which had visited the city”

κατερρίπτεσαν γὰρ πολλῶ πρότερον, ἐν Κορίνθῳ μὲν σεισμῶν ἐπιγενομένων ἑξαίσιων.

Archaeologists have attributed the collapse of certain buildings to this earthquake, but without providing substantial proof of the relationship. See the bibliography in Avramea and Kirkou (1988).

〈213〉 **6 September 543 •Cyzicus ▷seismic sea-wave?◁**

- sources 1 Mal. 482; Ioh. Ephes. 303; [Dion. Tellmahr.] 78-9 and 87; Theoph. 224
sources 2 The Great Chronogr. 9; *Chron.* 724 143; Cedren. 656; Zon. 2.63; Mich. Syr. 2.303
catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Downey (1955); Grumel (1958);
Hermann (1962); Shebalin *et al.* (1974); Comninakis and Papazachos (1982);
Papazachos and Papazachos (1989); Guidoboni (1989)

A destructive earthquake struck the city of Cyzicus. The chroniclers provide a variety of dates. Malalas, the only contemporary source, places it in the month of September [543], in the seventh indiction. Theophanes dates it to 6 September, in the seventh indiction, in the year of the world 6036 [543], on a Sunday. Cedrenus gives 6 September in the sixteenth year of the reign of Justinian, which would take us to 543. Since there is no certainty as to the exact date of the earthquake, we have followed the source which was closest to the event.

Malalas writes: "In the month of September of the 7th indiction an earthquake occurred in Cyzicus, and half of the city collapsed".

Μηνὶ Σεπτεμβρίῳ ἰνδικτιῶνος ζ' ἐγένετο σεισμός ἐν Κυζίκῳ, καὶ τὸ ἥμισυ τῆς αὐτῆς πόλεως ἔπεσε.

John of Ephesus adds to Malalas' account: "In the year 854 [of the Greeks; i.e. 542-543], there was an earthquake, and the city of Cyzicus collapsed. Most of the city was destroyed, and most of its wall was demolished, brought down and shattered, while the part which had not fallen was left tottering and leaning as if it were about to fall".

Ἐν τῷ ἔτει 854 τοῦ ἑλληνικοῦ, ὅτε ἐγένετο ἡ πόλις τοῦ Κυζικοῦ καταστράφη. ὁ πλεῖστον αὐτῆς τῆς πόλεως ἐδαμνίσθη, καὶ ἡ πλειοψηφία τῆς τοῦ τείλους τοῦ Κυζικοῦ τοῦ τείλους ἐδαμνίσθη, καὶ ἡ πλειοψηφία τῆς τοῦ τείλους τοῦ Κυζικοῦ τοῦ τείλους ἐδαμνίσθη.

This earthquake may be the one recorded in the *Chronicle of 724*, as having occurred in 544 AD. No location is given, but we are told that there was a seismic sea-wave, and that the earthquake occurred one year after the plague.

Theophanes dates this earthquake to 6 September in the year of the world 6036: "In this year, on the first day [Sunday] of the 7th indiction, a great earthquake occurred throughout the world, and half of Cyzicus collapsed. In the same year, the great bronze column near what is known as the imperial palace was completed, and the equestrian statue of the emperor Justinian was erected".

Τούτῳ τῷ ἔτει μηνὶ Σεπτεμβρίῳ ε', ἡμέρᾳ α', ἰνδικτιῶνος ζ', γέγονε σεισμός μέγας εἰς ὅλον τὸν κόσμον, ὥστε πτωθῆναι τὸ ἥμισυ τῆς Κυζίκου. καὶ τῷ αὐτῷ ἔτει ἐπληρώθη ὁ χαλκοῦς κίων ὁ μέγας, ὁ πλησίον τοῦ παλατίου, ὁ λεγόμενος Αὐγουστεύς. καὶ ἀνιχνέθη ἡ στήλη τοῦ βασιλέως Ἰουστινιανοῦ ἑφιππος.

〈214〉 **544/545 Aphrodisium, Dionysopolis, Odessus, Thrace ▷seismic sea-wave◁**

- sources 1 Mal. 481; Theoph. 224
sources 2 Georg. Mon. 628; Cedren. 657; Glyc. 269
catalogues Bonito (1691); Ambraseys (1962 b); Hermann (1962); Guidoboni (1989)

Malalas makes no more than a brief mention of a destructive seismic sea-wave. Theophanes takes up this information, probably using the original text of Malalas: "In this year [544/545] the sea advanced on Thrace by four miles [c.6 km] and covered it in the territories of Odessus and Dionysopolis and also Aphrodisium. Many were drowned in the waters. By God's command the sea then retreated to its own place".

Τούτῳ τῷ ἔτει ἐπανεῖστη ἡ θάλασσα τῇ Θράκῃ ἐπὶ μίλια δ' καὶ ἐκάλυπεν αὐτὴν ἐπὶ τὰ μέρη Ὀδύσσου καὶ Διονυσοπόλεως καὶ τὸ Ἀφροδίσιον· καὶ πολλοὶ ἐπνίγησαν ἐν τοῖς ὕδασι. καὶ πάλιν τῷ τοῦ θεοῦ προστάγματι ἀπεκατέστη ἡ αὐτὴ θάλασσα εἰς τοὺς ἰδίους τόπους.

Cedrenus provides the same information: "In the eighteenth year [of the reign of Justinian, i.e. 544/545], the sea flooded Thrace to a depth of four miles [c.6 km], reaching the area of Odessus, Dionysopolis and Aphrodisium, and many people drowned. Then at God's command the water returned to its proper place".

Τῷ ιη' ἔτει ἐπανεῖστη ἡ θάλασσα τῇ Θράκῃ ἐπὶ μίλια δ', καὶ ἐκάλυπεν αὐτὴν ἐπὶ τὰ μέρη Ὀδησοῦ καὶ Διονυσίουπολιν καὶ τὸ Ἀφροδίσιον, καὶ πολλοὶ ἐπνίγησαν ἐν τοῖς ὕδασι· καὶ πάλιν τῷ τοῦ θεοῦ προστάγματι ἀποκατέστη ἡ θάλασσα εἰς τοὺς ἰδίους τόπους.

It is likely that the flood in Thrace recorded by Glycas for the year 557 should in fact be related to the earthquake of 544/545: "Then the sea, too, burst from its confines, flood-ing Thrace for 3 miles [c.4.5 km], and overwhelming and destroying much land and many people".

Τότε καὶ ἡ θάλασσα ἐξελθοῦσα τῶν ὁρίων αὐτῆς καὶ μίλια τρία πρὸς τὰ μέρη τῆς Θράκης, καὶ πολλὰς χώρας καὶ ἀνθρώπους ἀποπνίξασα ὑπέστρεψε.

〈215〉 **c.8 April 546 •Constantinople**

sources Theoph. 225

catalogues Bonito (1691); Mallet (1853); Capelle (1924); Downey (1955); Grumel (1958); Hermann (1962); Guidoboni (1989)

Theophanes records an earthquake in the year of the world 6038 [546]: "And a great earthquake caused destruction at Byzantium about Easter time".

Καὶ ἐγένετο σεισμὸς μέγας ἐν Βυζαντίῳ, καὶ διαστροφή περὶ τοῦ ἁγίου πάσχα.

In 546, Easter fell on 8 April, so the earthquake presumably occurred at about that date.

〈216〉 **February 548 Constantinople**

sources 1 Mal. 483; Procop. *bell.* 7.29.4-5; Theoph. 226

sources 2 Cedren. 658

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Capelle (1924); Downey (1955); Grumel (1958); Hermann (1962); Guidoboni (1989)

The sources record a number of non-destructive shocks which struck Constantinople in 548. Malalas makes a general reference to earthquakes, without specifying where they occurred: "In that year continual earthquakes occurred".

Καὶ τῷ αὐτῷ χρόνῳ ἐγένοντο σεισμοὶ συνεχεῖς.

Procopius records: "At that time too, earthquakes of extraordinary severity occurred many times during the winter season, both in Byzantium and in other places, always at night. And the inhabitants of those cities, supposing that they would be overwhelmed, became very alarmed; but no harm befell them as a result of the earthquake".

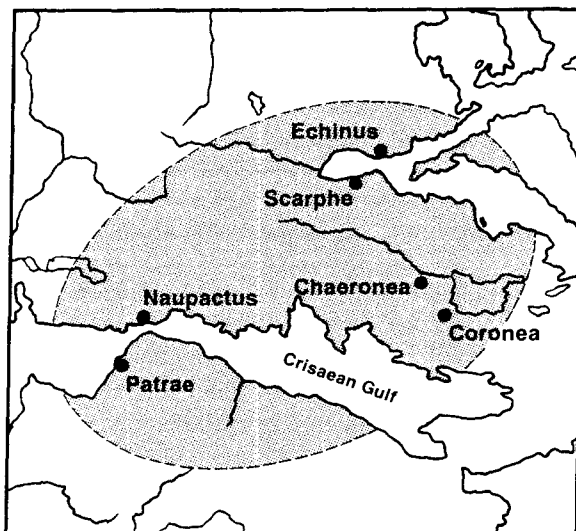
Τότε δὲ καὶ σεισμοὶ πολλάκις χειμῶνος ὥρα σκληροὶ τε λίαν καὶ ὑπερφυεῖς ἔν τε Βυζαντίῳ καὶ χωρίοις ἄλλοις ἐγένοντο, νύκτωρ ἅπαντες. καὶ οἱ μὲν ταύτῃ ὠκημένοι

καταχωσθήσεσθαι ὑποτοπήσαντες ἐν δέει μεγάλῳ ἐγένοντο, οὐδὲν μὲντοι ἐνθὲνδε φλαῦρον αὐτοῖς ξυνηνέχθη παθεῖν.

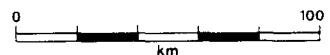
According to Theophanes, there was a particularly violent tremor in February 548: "In that year [of the world 6040, i.e. 548] continual earthquakes occurred. There was heavy rain as well as a great earthquake in the month of February, when every-one despaired and became very frightened, and held processions of supplication and begged God to be saved from the impending dangers".

Τούτῳ τῷ ἔτει ἐγένοντο σεισμοὶ συνεχεῖς καὶ βροχαὶ μεγάλαι, ὁμοίως καὶ τῷ φεβρουαρίῳ μηνὶ σεισμὸς μέγας, ὥστε πάντας ἀπογινώσκειν καὶ ἐν φόβῳ μεγάλῳ γίνεσθαι καὶ λιτανεύειν καὶ δέεσθαι τοῦ θεοῦ ῥυσθῆναι τῶν ἐπικειμένων ἀπειλῶν.

Cedrenus dates the earthquake to the twenty-first year of the reign of Justinian, i.e. 547/548.



551



<217> **551 ●Chaeronea, ●Coronea, ●Echinus, ●Naupactus, ●Patras [Patrae], ●Scarphe, Achaia, Boeotia, the Crisaean Gulf**
 ▷seismic sea-wave, surface faulting◁

sources Procop. *bell.* 8.25.16-23

literature Meyer (1979)

catalogues Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Galanopoulos (1961); Ambraseys (1962 b); Shebalin *et al.* (1974); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

Procopius describes a great earthquake which struck central Greece, causing serious damage, substantial changes to the terrain and a seismic sea-wave: "It was at this time that extraordinary earthquakes occurred throughout Greece, both Boeotia and Achaia and the country on the Crisaean Gulf being badly shaken. Countless towns and eight cities were levelled to the ground, among them Chaeronea and Coronea and Patrae and all of Naupactus, where there was also great loss of life. The earth was split open in many places and chasms formed. Now some of these openings came together again so that the earth presented the same form and appearance as before, but in other places they remained open, with the consequence that the people in such places are not able to intermingle with each other except by making many detours. But in the gulf between Thessaly and Boeotia there was a sudden influx of the sea at the city called Echinus and at Scarphe in Boeotia. Advancing far over the land it deluged the towns there and levelled them immediately. And for a long time the

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547-548

mainland was flooded in this way, so that for a very considerable period it was possible for people to walk to the islands in the gulf, since the waters of the sea, obviously, had abandoned their proper place, and spread over the land in this strange way, as far as the mountains which rise there. But when the sea returned to its proper place, fish were left on the ground [...]. But in the locality where the so-called Cleft is located there was a tremendous earthquake which caused more loss of life than in all the rest of Greece, particularly on account of a certain festival which they happened to be celebrating there and for which many had gathered from all Greece”.

Ἐν τούτῳ δὲ τῷ χρόνῳ σεισμοὶ κατὰ τὴν Ἑλλάδα ἐπιπεσόντες ἐξαίσιον τὴν τε Βοιωτίαν καὶ Ἀχαΐαν καὶ τὰ περὶ κόλπον τὸν Κρισαῖον κατέσεισαν. καὶ χωρία μὲν ἀνάριθμα, πόλεις δὲ ὅκτῳ ἐς ἑδαφος καθεῖλον, ἐν ταῖς Χαιρώνειά τε καὶ Κορώνεια ἦν καὶ Πάτραι καὶ Ναύπακτος ὅλη, ἔνθα δὲ καὶ φόνος γέγονεν ἀνθρώπων πολὺς. καὶ χάος δὲ τῆς γῆς πολλαχῇ ἀποσχισθείσης γεγένηται. τὰ δὲ διαιρεθέντα ἔνια [σχῆμα] μὲν αὖθις ἐς ταῦτὸ ξυνιόντα τὸ πρότερον τῇ γῇ σχῆμά τε καὶ εἶδος ἀπέδωκεν, ἔστι δὲ οὐ καὶ διεστηκότα μεμένηκεν· ὥστε οὐδὲ ἀλλήλοις ἐπιμίγνυσθαι οἱ τῆδε ἀνθρώποι εἰσι δυνατοὶ ὅτι μὴ περιόδοις πολλαῖς χρώμενοι. ἐν δὲ γε τῷ πορθμῷ, ὅνπερ μεταξὺ Θεσσαλίας τε καὶ Βοιωτίας ξυμβαίνει εἶναι, γέγονέ τις ἐκ τοῦ αἰφνιδίου τῆς θαλάσσης ἐπιρροὴ ἀμφὶ τε πόλιν τὴν Ἐχιναίων καλουμένην καὶ τὴν ἐν Βοιωτοῖς Σκάρφειαν. πόρρω τε τῆς ἡπείρου ἀναβάσα καὶ κατακλύσασα τὰ ἐκείνη χωρία ἐς ἑδαφος καθεῖλεν εὐθύς. χρόνος τε τῇ θαλάσσει πολὺς ἐπιχωριαζούσῃ τῇ ἡπείρῳ ἐτρίβη, ὥστε τοῖς ἀνθρώποις περὶ τοῦ βυθίου ἐπὶ πλείστον γενέσθαι τὰς νήσους, αἵπερ ἔντοσθεν τοῦ πορθμοῦ τοῦτου τυγχάνουσιν οὐσαι. τοῦ τῆς θαλάσσης δηλονότι ῥοθίου ἐκλιπόντος μὲν τὴν αὐτοῦ χώραν, ἐπιπολάζοντος δὲ παρὰ δόξαν τὴν γῆν ἄχρι ἐς τὰ ὄρη, ἃ ταύτῃ ἀνέχει. ἡνίκα δὲ τῇ θαλάσσῃ ἐς τὰ οἰκεία ἐπανιέναι ξυνέπεσεν, ἰχθύες ἐν τῇ γῇ ἀπελείποντο, ὥνπερ ἢ ὄψις ἀήθης παντάπασιν οὐσα τοῖς τῆδε ἀνθρώποις τερατώδης τις ἔδοξεν εἶναι. οὓς δὲ ἐδωδίκους εἶναι οἰόμενοι ἀνείλοντο μὲν ὡς ἐψήσοντες, θερμῆς δὲ αὐτῶν τῆς ἐκ τοῦ πυρὸς ἀφαμένης ἐς ἰχώρας τε καὶ σηπεδόνας οὐ φορητὰς τὸ σῶμα ὅλον ἀποκεκρίσθαι ξυνέπεσεν. ἀμφὶ δὲ τὰ ἐκείνη χωρία, οὗ δὴ τὸ Σχίσμα ὠνόμασται, καὶ σεισμὸς ὑπερμεγέθης γενόμενος πλείω φόνον ἀνθρώπων ἢ ἐν πάσῃ τῇ ἄλλῃ Ἑλλάδι εἰργάσατο, μάλιστα ἐπεὶ τινα ἑορτὴν πανηγυρίζοντες ἔτυχον ἐκ πάσης τε τῆς Ἑλλάδος ἐνταῦθα τότε τούτου δὴ ἕνεκα ξυνειλεγμένοι πολλοί.

Meyer (1979, under the entry “Olympia”) attributes the collapse of the temple of Zeus at Olympia to this earthquake.

(218) **9 July 551 •Berytus, •Botrys, •Byblus, •Sidon, •Trieris, •Tripolis, •Tyre, Arabia, Mesopotamia, Palestine, Syria**
▷seismic sea-wave, landslide◁

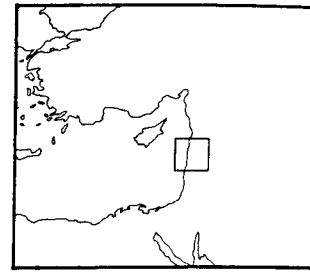
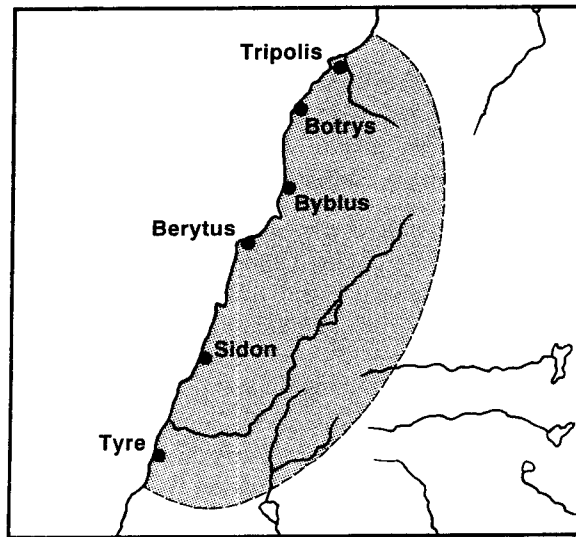
sources 1 Mal. 485; Ioh. Ephes. 2.326-7; Agath. 2.15; [Anton. Plac.] *itin.* 1.39.159.7-17;
Vita S. Sym. Stil. Iun. 105

sources 2 *Fragm. Tuscul.* 4; [Dion. Tellmahr.] 128 and 133-4; Theoph. 227; Georg. Mon. 642; Cedren. 659;
 Mich. Syr. 308-11

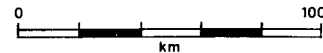
literature Stein (1949); Cameron (1970); Dagron (1974); Grosdidier de Matons (1981); Russell (1985)

catalogues Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a);
 Amiran (1950-51); Grumel (1958); Ambraseys (1962 b); Hermann (1962); Ben-Menahem (1979);
 Guidoboni (1989)

The anonymous *Itinerarium* attributed to Antoninus of Piacenza, describes the consequences of a disastrous earthquake which affected a long stretch of the Lebanese coast: “We came to the island of Antharidus near Syria and then to Tripolis in Syria,



9 July
551



where St. Leontius is buried. This and other cities were reduced to ruins by an earthquake in the time of the emperor Justinian. Then we came to Byblus, which was also destroyed with its inhabitants, and so to the city of Trieris, which was also reduced to ruins in the same way [...] Then we came to the magnificent city of Berytus, where there was recently a centre for literary study. That city was also destroyed. The bishop of the city told us that, without counting foreigners who were staying there briefly, thirty thousand known people had been killed. The city itself lies at the foot of the mountain of Lebanon".

Venimus in partes Syriae in insula Antharidus et inde venimus in Tripoli Syriae, in qua sanctus Leontius requiescit; quae civitas tempore Iustiniani imperatoris subversa est a terrae motu cum aliis civitatibus. Venimus exinde Biblo, quae et ipsa subversa est cum hominibus, item in Triarim civitatem, quae et ipsa similiter subversa est [...] Deinde venimus in civitate splendidissima Berito, in qua nuper studium fuit litterarum. Quae civitas subversa; dicente nobis episcopo civitatis, quia cognitae personae, quae sciebantur nominatim, excepto peregrinis triginta milia ad breve missi hic perierunt. Ipsa civitas iacet sub montana Libani.

Malalas also records a major landslide and a substantial seismic sea-wave: "In the 14th indiction a severe and tremendous earthquake occurred throughout the land of Palestine, in Arabia and in the land of Mesopotamia, Antioch, Phoenice Maritima and Phoenice Libanensis. In this terror the following cities suffered: Tyre, Sidon, Berytus, Tripolis, Byblus, Botrys and parts of other cities. Large numbers of people were trapped in them. In the city of Botrys part of the mountain called Lithoprosopon, which is close to the sea, broke off and fell into the sea. The piece of mountain formed a harbour, in which very large ships were able to anchor. The city had not had a harbour in the past. The emperor sent money to all the provinces and restored parts of these cities. At the time of the earthquake the sea retreated for a mile and many ships were destroyed. Then at God's command the sea was restored to its original bed".

Ἰνδικτιῶνος ἰδ' ἐγένετο σεισμὸς μέγας καὶ φοβερὸς ἐν πάσῃ τῇ χώρᾳ τῆς Παλαιστίνης ἐν τε Ἀραβίᾳ καὶ ἐν τῇ χώρᾳ τῆς Μεσοποταμίας καὶ Ἀντιοχείας καὶ Φοινίκης παράλου καὶ Λιβανησίας. καὶ ἐν αὐτῷ τῷ φόβῳ ἔπαθον αἱ πόλεις, τοῦτ' ἐστὶ Τύρος, Σιδὼν, Βηρυτός, Τρίπολις, Βύβλος, Βότρυσ, καὶ ἄλλων πόλεων μέρη. κατελήφθησαν δὲ ἐν αὐταῖς καὶ πλήθη ἀνθρώπων. ἐν δὲ τῇ πόλει Βότρυος ἀπεσπάσθη ἀπὸ τοῦ παρακειμένου τῇ θαλάσσει ὄρους τοῦ ἐπὶ κλινῇ Λιθοπροσώπου μέρος καὶ κατηνέχθη εἰς τὴν θάλασσαν, καὶ ἀπετέλεσε λιμένα, ὥς δύνασθαι ὁρμεῖν ἐν τῷ λιμένι τοῦ ἀποσπασθέντος ὄρους πλοῖα παμμεγέθη· οὐκ εἶχε γὰρ ἡ αὐτὴ πόλις τὸ πάλαι.

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λιμένα. ὁ δὲ αὐτὸς βασιλεὺς ἀπέστειλε χρήματα ἐν πάσαις ταῖς ἐπαρχίαις καὶ ἀνήγειρε φανερά τῶν αὐτῶν πόλεων. ἐν δὲ τῷ καιρῷ τοῦ σεισμοῦ ἔφυγε θάλασσα εἰς τὸ πέλαγος ἐπὶ μίλιον ἓν, καὶ ἀπώλοντο πλοῖα πολλὰ· καὶ πάλιν τῇ τοῦ θεοῦ κελεύσει ἀπεκατέστη ἡ θάλασσα εἰς τὴν ἀρχαίαν κοίτην.

John of Ephesus is probably using the original version of Malalas when he records: "In the year 870 [of the Greeks; i.e. 558-559 AD.], there was a severe earthquake, and Beirut collapsed, as did many coastal cities and villages in Galilee, Arabia, Palestine and Samaria. Along the whole Phoenician coast, too, the sea withdrew and retreated nearly two miles. As for the terrible disaster and the great and remarkable portent which happened in the city of Beirut in Phoenicia, when the earthquake took place and the cities collapsed, we have decided to make it a warning sign for the knowing of posterity. For when the earthquake came from heaven, the sea withdrew and retreated from Beirut and the other coastal cities of Phoenicia for a distance of nearly two miles; the dreadful depths of the sea became visible and various and amazing sights were revealed: sunken ships full of different cargoes and other ones which suddenly, when the sea withdrew from the land, were moored in the harbours, settled on the ground and they were broken to pieces when the sea left them and withdrew on God's command [...] Then, by a secret command, a tremendous surge of the sea rushed up to return to its original depth, overwhelmed and consumed all these wretched people in the depths of its swirling waters. They had rushed to find wealth in the depths of the sea and, like Pharaoh, they went down to the depths and were drowned like stones, as it is written; and God rolled the waters of the sea over them, as the flood burst forth and flowed back to its former abundance. Those who were still on the edge of the shore were hurrying to go down; when they saw the deep sea rushing back to its former position, those who were closest to the land fled out. But after they had escaped, as if from hunters, a violent earthquake took place, which overturned houses in the cities, especially at Beirut; they fell and crushed those who had escaped from the sea and so nobody survived. As the sea was rising up against them from behind, the earthquake brought down the city in front of them.

[illegible]

Theophanes' account of the occurrence (which is by no means "The most extensive ancient account of this earthquake", as Russell 1985, p.44 claims) is similar to that of Malalas, though he adds a mention of imperial help, but more briefly than John of Ephesus. The account of the 11th-12th century writer Cedrenus derives from Theophanes.

Agathias records the disaster in a historical context which can be dated to 551, but first mentions the Constantinople earthquake of 554 (see entry (219)) as having occurred "roughly during the same period": "The lovely city of Berytus, the jewel of Phoenicia, was completely ruined and its world-famous architectural treasures were reduced to a heap of rubble, practically nothing but the bare pavements of the buildings being left. Many of the local inhabitants were crushed to death under the weight of the wreckage, as were many cultivated young men of distinguished parentage who had come there to study the Law".

Βηρυτὸς γοῦν ἡ καλλίστη, τὸ Φοινίκων τέως ἐγκαλλώπισμα, τότε δὴ ἀπηλαίσθη ἅπαντα. καὶ κατέρριπτο τὰ κλεινὰ ἐκεῖνα καὶ περιλάλητα τῆς οἰκοδομίας δαιδάλματα, ὥς μηδὲν οἰοῦν σχεδὸν που λελεῖσθαι ἢ μόνα τῆς κατασκευῆς τὰ ἐδάφη. πολὺς μὲν οὖν ὄμιλος ἰθαγενῶν τε καὶ ἐνδαπίων ἀνδρῶν ἀπολώλασιν ὑποπεπισμένοι τῷ ἄχθει, πολλοὶ δὲ νέοι ἐπήλυδες εὐπατρίδαι τε καὶ παιδείας ἄριστα ἔχοντες, οἱ δὲ παρήσαν τοὺς Ῥωμαίων αὐτοῦ ἀναλεξόμενοι νόμους.

Agathias reports that after the earthquake the Law School of Berytus was transferred to Sidon, and that Berytus was later rebuilt, so that it was still recognisable, though much changed.

The *Life of St. Symeon the Stylite the Younger* records that St. Symeon predicted this earthquake after having a vision: "The next day, at about the tenth hour, the whole land was shaken by a terrible earthquake, of a kind unknown to past generations, and the towns and villages of the coast collapsed in ruins, in accordance with the vision of Symeon, and the mountains were uprooted and violently split open, and chasms opened up in the earth in various places. The sea receded for many hours, and ships broke up as they violently struck the land. However, the region to the north, from Laodicea to Antioch, remained standing, and only a few towers and church walls were damaged, but as St. Symeon had said, no buildings collapsed, and the area to the south from Tyre to Jerusalem was also preserved, just as Symeon had seen in his vision".

Τῇ δὲ ἑξῆς περὶ ὥραν δεκάτην τῆς ἡμέρας ἐσειέσθη πᾶσα ἡ γῆ σεισμῷ μεγάλῳ, οἷον οὐδὲ αἱ παρελθοῦσαι πολλὰ γενεαὶ ἀπεμνημόνευον γενέσθαι, καὶ ἔπεσαν πόλεις καὶ χῶραι τῆς παράλου κατὰ τὴν ὀφθεῖσαν αὐτῷ θεωρίαν καὶ τὰ ὄρη ἐθρύβη βία σχισθέντα, καὶ ἡ γῆ χάσματα ἔσχε κατὰ τόπους καὶ ἡ θάλασσα ἔφυγεν ἐκ τοῦ τόπου αὐτῆς ἐπὶ πολλὰς τὰς ὥρας, καὶ τὰ πλοῖα ἐπὶ τοῦ ξηροῦ καταρραγέντα συνετρίβησαν. Ἀπὸ μέντοι Λαοδικείας κατὰ Ἀντιόχειαν ἐπὶ τὸ βόρειον κλίτος ἔστησαν πάντα, μόνον πύργων τινῶν τοῦ τείχους καὶ τοίχων τῶν ἐκκλησιῶν διαρραγέντων πῶσις δὲ οὐ γέγονε κατὰ τὸν λόγον τοῦ ἁγίου, καὶ τὰ ἀπὸ Τύρου δὲ ἐπὶ τὰ Ἱεροσόλυμα καὶ τὸ μεσημβρινὸν κλίτος διεφυλάχθη ὡσαύτως κατὰ τὸ εἶδος τῆς θεωρίας αὐτοῦ.

Although there are references in this text to the earthquake of 557 at Constantinople (see entry (225)), this is clearly the one recorded by Antoninus of Piacenza, Malalas and Theophanes. What is particularly important is that the principal damage is recorded as being confined to the area between Antioch and Tyre, whereas there was apparently only minor damage further north and south.

Stein (1949, p.757, note 5) had already pointed out that the *Life of St. Symeon the Stylite the Younger* brings together events which in fact happened in the Mediterranean area over a period of about seven years.

Pseudo-Dionysius of Tellmahre dates the earthquake to 552/3 (and creates a doublet by recording it again for 558/9 at Berytus), whereas Michael the Syrian gives the year as 557. The *Fragmenta Tusculana* give the date as 6 July.

An echo of these events can be perhaps found in Hymn 51 by Romanos Melodos, in which reference is made to a series of places which had been struck by earthquakes, with accompanying biblical quotations: see Grosdidier de Matons (1981, pp.271-91); Gatier (1984, p.88), on the other hand, thinks Romanos Melodos is referring to the earthquake of 502.

The sources thus agree in locating the most damaging effects of this earthquake along the coast of Phoenicia (present-day Lebanon). It is therefore very likely that the surrounding regions (Arabia, Mesopotamia, Palestine and Syria) mentioned by Malalas and Theophanes, were either subject to secondary effects or to after-shocks with different epicentres.

For a bibliography of damage attributed by archaeologists to this earthquake, see Russell (1985, p.45).

⟨ 219 ⟩ **the night of 15 August 554 ●Constantinople, ●Nicea?,
●Nicomedia**

- sources 1 Mal. 486-7; Ioh. Ephes. 325-6; Agath. 2.15.1 ff.; *Vita s. Sym. Stil. Iun.* 106; Theoph. 229; *Anth. Pal.* 9.425-7;
- sources 2 [Dion. Tellmahr.] 126; Georg. Mon. 642; Cedren. 679
- literature Cameron (1970)
- catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Capelle (1924); Downey (1955); Grumel (1958); Hermann (1962); Shebalin *et al.* (1974); Ben-Menahem (1979); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

Malalas describes a violent earthquake in Asia Minor in August 554 as follows: "In the month of August of the second indiction there was a tremendous earthquake and many houses, baths and churches were damaged, and also parts of the walls at Byzantium. During this shock, the spear, which the statue in the Forum of Constantine was holding, fell and drove itself into the ground to a depth of three cubits. Many were trapped in the rubble. During this shock other cities were also damaged, amongst them Nicomedia, part of which collapsed. Days later people were brought up alive out of the rubble at Nicomedia. The earthquake lasted for 40 days".

Ἐν δὲ τῷ αὐγούστῳ μηνὶ τῆς δευτέρας ἰνδικτιῶνος ἐγένετο σεισμὸς φοβερός, ὥστε παθεῖν οἴκους πολλοὺς καὶ λουτρά καὶ ἐκκλησίας καὶ μέρη τῶν τειχέων παθεῖν ἐν Βυζαντίῳ. ἐν αὐτῷ δὲ τῷ φόβῳ ἔπεσεν ἡ λόγχη, ἣν ἐκράτει τὸ ἄγαλμα τὸ ἐν φόρῳ Κωνσταντίνου, καὶ κατεπάρη ἐν τῇ γῇ ἐπὶ πῆχεις τρεῖς. ἐν δὲ τοῖς συμπτώμασι πολλοὶ συνελήφθησαν. ἐν αὐτῷ δὲ τῷ φόβῳ καὶ ἄλλαι πόλεις ἔπαθον, ἐν οἷς καὶ Νικομηδείας μέρος καταπεσεῖν. ἐκ δὲ τῶν συμπτωμάτων Νικομηδείας καὶ μεθ' ἡμέρας τινὲς ζῶντες ἀνηνέχθησαν. ἐπεκράτησε δὲ ὁ αὐτὸς σεισμὸς ἡμέρας μ'.

Agathias records this earthquake at Constantinople along with that of 551 at Berytus (see entry ⟨ 218 ⟩): "In summer time, roughly during the same period, there was a violent earthquake in Constantinople and in many parts of the Empire, with the result that several cities both on the islands and the mainland were razed to the ground and their inhabitants wiped out".

Ὑπὸ δὲ τὸν αὐτὸν χρόνον, θέρους ὥρα, ἔσεισε μέγα ἐν τε Βυζαντίῳ καὶ πολλαχοῦ τῆς Ῥωμαίων ἀρχῆς, ὥς καὶ πόλεις συχνάς, νησιωτικὰς τε καὶ ἡπειρώτιδας, ἀθρόον ἀνατραπῆναι καὶ ἄρδην τοὺς οἰκήτορας διαφθεῖραι.

Pseudo-Dionysius of Tellmahre dates the earthquake at Constantinople and Nicomedia to 550/551.

The earthquake is also recorded by Theophanes, who gives the specific date of 15 August: "In this year [of the world 6046, i.e. 554], on 15 August, in the second indication, at midnight, as Sunday began, there was a dreadful earthquake in Constantinople, which caused particular damage to many houses, baths and churches, and a section of the walls, especially in the districts near the Golden Gate. Many people were killed. A large part of Nicomedia was also reduced to ruins. This one earthquake lasted for forty days. For a while men devoted themselves to penitence, saying prayers and spending long periods in church, until the love of God manifested itself again in these people who had been plunged into misfortune. Every year this earthquake is commemorated in the Campus, where the people gather in prayer".

Τούτω τῷ ἔτει μηνὶ αὐγούστῳ ιε', Ἰνδικτιῶνος β', ὥρα μεσονυκτίου, διαφανούσης κυριακῆς, ἐγένετο σεισμὸς φοβερός, ὥστε παθεῖν οἴκους πολλοὺς καὶ λουτρά καὶ ἐκκλησίας καὶ μέρος τῶν τειχῶν Κωνσταντινουπόλεως, μάλιστα τὸ τῆς Χρυσῆς πόρτης· καὶ πολλοὶ ἀπέθανον. πέπτωκε δὲ καὶ Νικομηδείας μέρος πολὺ. ἐπεκράτησε δὲ ὁ αὐτὸς σεισμὸς ἡμέρας μ'. καὶ πρὸς ὀλίγον οἱ ἄνθρωποι κατενύγησαν λιτανεύοντες καὶ προσεδρεύοντες καὶ εἰς τὰς ἐκκλησίας μένοντες, καὶ πάλιν φιλανθρωπίας θεοῦ γενομένης ἐπὶ τὸ χεῖρον γεγόνασιν. γίνεται δὲ ἡ μνήμη τοῦ σεισμοῦ τούτου κατ' ἔτος ἐν τῷ Κάμπῳ, λιτανεύοντος τοῦ λαοῦ.

The *Life of St. Symeon the Stylite the Younger* mentions an earthquake at Nicomedia which also "partly" affected Nicea. This was probably a single occurrence, though the nature of the source makes it difficult to be quite certain.

Hermann (1962, col.1111) identifies two earthquakes, one on 15 August 553 and the other in August 554. For the date of the evidence provided by Agathias, see Cameron (1970, p.138 ff.).

<220> 14 October 554 Alexandria, ●Egypt

sources Agath. 2.15.1 ff.; Ioh. Nik. 90.81-3 (p.159 [279]/393 [513] Zotenberg = p.143 Charles)
catalogues von Hoff (1840); Sieberg (1932 a)

Agathias records a slight tremor which he himself felt at Alexandria in Egypt. His account is particularly important for its analysis of the reactions of the inhabitants: "At that time also some slight tremors were felt in the great metropolis of Alexandria on the Nile, an altogether unusual occurrence for those parts. All the inhabitants and particularly the very old were amazed at this apparently unprecedented phenomenon. Nobody stayed indoors. The populace congregated in the streets, seized with unwarranted panic at the suddenness and novelty of the event. I myself was in Alexandria at the time, completing the prescribed studies which lead to the law course proper, and I must confess that I was quite overcome with fear considering the faintness of the tremors. What really worried me, though, was the fact that people's houses there are not at all strongly built and quite incapable of standing up to even a small amount of vibration, being frail and flimsy structures consisting of a single thickness of stone. There was alarm even among the educated section of the community — not, I think, at what had actually taken place, but because it seemed reasonable to expect that the same thing would happen again".

Τότε δὲ καὶ ἐν τῇ μεγάλῃ Ἀλεξανδρείᾳ, τῇ πρὸς τῷ Νείλῳ ἰδρυμένη ποταμῷ, καὶ ταῦτα οὐκ εἰωθὸς σειεσθαι τὸ χωρίον, συναίσθησιν τις τοῦ κλόνου ἐλαχίστη μὲν καὶ ἀφαιροτάτη καὶ οὐ πάμπαν ἀρίδης, γέγονε δὲ ὅμως. ἅπαντες δὲ οὖν οἱ ἐπιχώριοι

καὶ μάλιστα οἱ σφόδρα γεγηρακότες ἐν θαύματι μεγάλῳ τὸ ξυνενεχθὲν ἐποιοῦντο, ὡς οὐπω πρότερον γεγενημένον, ἔμενέ τε οἴκοι ὅστις οὐδεὶς, ἀλλ' ἀνὰ τὰς λεωφόρους τὰ πλήθη ξυνέρρει, τῷ ἀπροσδοκῆτῳ δὴ πού καὶ παραδόξῳ πέρα τοῦ μετρίου καταπεπληγμένοι. ἐμοὶ δὲ γε καὶ αὐτῷ (ἐτύγχανον γὰρ αὐτοῦ διατρίβων παιδείας ἔνεκα τῆς πρὸς τῶν νόμων) δεδιέναι προσήει, καὶ ταῦτα ἐπὶ λίαν σμικρᾷ τῇ κινήσει, λογιζομένῳ, ὅτι δὴ αὐτοῖς αἱ οἰκοδομαὶ οὐκ ἰσχυραὶ οὐδὲ εὐρεῖαι τυγχάνουσιν οὔσαι οὐδὲ οἶαι καὶ πρὸς βραχὺ ἀνασχέσθαι δονούμεναι, ἀλλ' ἰσχυρὰ ἄγαν καὶ ἀσθενεῖς (ἐφ' ἐνὶ γὰρ ὑφαίνονται λίθῳ). ἀλλὰ γὰρ καὶ ὅτι λόγιμον ἐν τῇ πόλει, ἐδείμαινον καὶ οἶδε, οὐ τι πού, οἶμαι, τὸ ἤδη παρωχηκός, ἀλλ' ὅτι αὐτοῖς καὶ ἐσαυθὶς ταῦτ' οὗτο ξυμβῆσεσθαι οὐκ ἀπὸ τρόπου ἐδόκει.

John of Nikiu (quoted here in the Ethiopic translation) describes an earthquake in Egypt. In this case his source is a local one, not another Byzantine chronicle: "In the days of the emperor Justinian [527-565] there was a great earthquake in the land of Egypt, and many cities and villages were swallowed up in the abyss. Those who lived in the country made prayers and many intercessions with tears, being grieved on account of the destruction that had occurred. [82] After a year, the wrath (of heaven) ceased and the earthquakes which had persisted everywhere came to an end. The Egyptians commemorate this day every year on the 17th of Teqemt [14 October]. And the memory of this calamity had been preserved for us by our fathers, the god-bearer Egyptian monks. For these earthquakes were due to the change in the orthodox faith brought about by the emperor Justinian, who had hardened his heart more than his father's brother [i.e. Justin I], who had preceded him".

ወበመዋዕሊሁ፡ዓዲ፡ለዩስትያኖስ፡ንጉሥ፡ኮነ፡ድልቅልቅ፡ዐቢይ፡ውስተ፡ሀገረ፡ምስር፤ወአህጉር፡ብዙኅ፡ወአድያም፡ተሠዋሙ፡ውስተ፡ማዕምቅ፡።ወአለሂ፡ሀለዉ፡በሐቅል፡ገብሩ፡ጸሎተ፡ወስለለተ፡ብዙኅ፡በብካይ፡እንዘ፡የኅዝነ፡በእንተ፡ሐጉል፡ዘኮነ፡።ወእምድኅረ፡ዓመት፡ኅድሐ፡መዓት፡ወቆመ፡ድልቅልቅ፡ዘኮነ፡ውስተ፡ኩሉ፡መካን፡።ወኮነ፡ምስራውያን፡ይገብሩ፡ተዝካረ፡ዝንቱ፡ዕለት፡ለለኩሉ፡ዓመት፡አመ፡፤ወኋሪ፡ለዋቅምት፡።ወለዝንቱ፡ሐማም፡ዘከሩነ፡አበዊነ፡መነኮሳት፡ግብጸውያን፡ለባስያነ፡እምላክ፤እስመ፡ምክንያተ፡ዝንቱ፡ድልቅልቅ፡ኮነ፡በእንተ፡ወልጦተ፡ሃይማኖት፡አርቶዶክሳዊት፡እንተ፡ኮነት፡በምክንያተ፡ንጉሥ፡ዮስትያኖስ፤እስመ፡ውእቱ፡ወሰከ፡ጽንዐተ፡ልብ፡እምነ፡እኅወ፡አቡሁ፡ዘኮነ፡እምቅድሜሁ፡።

The context of the above passage seems to suggest that the mention here of religious measures taken by Justinian is almost certainly a reference to those which he took against the Monophysites at the council of Constantinople in May-June 553 and which were definitively approved by Pope Vigilius in Rome in the *Constitutum* of 23 February 554. The repression which followed was certainly more severe than that imposed by Julian, who had abandoned the repression of anti-Chalcedonite beliefs in Egypt.

<221> 554-558 •the island of Cos >seismic sea-wave<

sources Agath. 2.16.1-6

literature Cameron (1970)

catalogues von Hoff (1840); Schmidt (1881); Sieberg (1932 a); Galanopoulos (1960); Ambraseys (1962 b); Ben-Menahem (1979); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

Agathias records that the island of Cos was struck by a violent earthquake followed by a seismic sea-wave: "At that time [Agathias had been speaking about the earthquake at Alexandria in 554 (see entry <220>) and went on to a general consideration of the causes of earthquakes] the island of Cos which lies at the southern end of the Aegean was almost completely destroyed. Indeed, except for one small part of the island prac-

tically nothing was left standing, and the disaster was unprecedented in its scale and complexity. The sea rose up to a fantastic height and engulfed all the buildings near the shore, destroying them together with their contents and inhabitants. The heaving mass was of such enormous proportions that it flung down everything there that its surging crests could not ride over. Almost all the inhabitants perished indiscriminately, whether they happened to have taken refuge in places of worship or to have stayed in their homes or gathered together in some other spot. I happened to have occasion to disembark there myself just after the disaster, when I was sailing back from Alexandria to Constantinople (the island is of course on the route). When I set foot on shore I was confronted with a spectacle that beggared description. Practically the whole city was reduced to a gigantic heap of rubble, littered with stones and fragments of broken pillars and beams, and the air was murky with thick clouds of dust, so that one could barely surmise the existence of what had once been streets from a few vague hints of their presence. A mere handful of houses stood intact, and they were not the ones that had been built with stones and mortar or some such seemingly more solid and durable substance, but only those made in peasant style out of unbaked bricks or mud. Here and there could be seen a few men whose haggard and dejected faces wore a look of hopeless apathy. On top of all their other ills the entire local water-supply had been contaminated with sea-water and rendered undrinkable. All was ruin and desolation. The only vestige of distinction left the city was the famous name of the Asclepiadae and its proud boast of having been the birthplace of Hippocrates".

Κατ' ἐκεῖνο γάρ τοῦ καιροῦ καὶ ἡ Κῶς ἡ νῆσος, ἡ πρὸς τῷ τέρματι τοῦ Αἰγαίου κειμένη, ἐλάχιστόν τι μέρος αὐτῆς ἐσέσωστο, ἡ δὲ ἄλλη ἅπασα ἐπεπτώκει, ποικίλα τε αὐτῇ καὶ ἀνήκουστα προσεγένετο πάθη. ἥ τε γὰρ θάλαττα ἐπὶ πλείστον ἀρθεῖσα κατέκλυσε τὰ παράκτια τῶν οἰκημάτων καὶ διέφθειρεν αὐτοῖς χρήμασι καὶ ἀνθρώποις, τό τε μέγεθος τοῦ βρασμοῦ, ἐξαισίον οἷον γεγενημένον, τὰ ἔνθα οὐκ ἐνῆν ἀναρριχασθαι τὸ ρόθιον, ἅπαντα ἔρριψε καὶ κατέβαλεν. ἀπολώλασι δὲ χύδην σχεδὸν τι ἅπαντες οἱ ἄστοι, εἴτε ἐν ἱεροῖς ἐτύγχανον πεφευγόντες εἴτε καὶ οἶκοι διαιτώμενοι εἴτε καὶ ἄλλοσέ ποι ξυνειλημένοι. ἐμοὶ γοῦν ἐκ τῆς Ἀλεξάνδρου ὑπὸ τὸν αὐτὸν χρόνον μετὰ τὸ Βυζάντιον ἀνακομιζομένῳ καὶ ἐν τῇδε τῇ νήσῳ, οὕτω παρασχόν (ἐν παράπλῳ γὰρ κεῖται), κατάραντι οἰκτρὸν τι πέφηνε θέαμα καὶ ὅποιον οὐκ ἂν ἀποχρῶντός ὑπογράψοι ὁ λόγος. ἅπαν μὲν γὰρ σχεδὸν που τὸ ἄστὺ χῳμά γε ἦν ἐπὶ μέγα ἡρμένον καὶ λίθοι κείμενοι σποράδην κιόνων τε τρύφη καὶ ξύλων κατεαγόντων καὶ κόνις πολλὴ ὑπερθεῖν φερομένη καὶ ἐπηλυγάζουσα τὸν ἀέρα, ὥς μὴδὲ αὐτὰ που τὰ τῶν λεωφόρων χωρία ῥαδίως διαγινώσκεσθαι, πλὴν ὅσον ὑπονοῆσαι. ὀλίγα δὲ ἄττα σωμάτια εἰστήκεσαν ἀπαθῇ, καὶ ταῦτα οὐχ ὅσα τιτάνῳ τυχόν καὶ λίθῳ λαὶ ταύτῃ δὴ τῇ στερεωσιωτέρᾳ καὶ μᾶλλον μονίμῳ κατὰ τὸ εἶκός ὕλη ἐξείργαστο. μόνα δὲ τὰ ἐκ πλίνθου ἀπέφθου καὶ πηλοῦ ἀγροικότερον πεποιημένα· ἄνδρες δὲ σποράδην ὀλίγιστοι ἀνεφαίνοντο σκυθρωποὶ τε ἄγαν καὶ κατηφεῖς καὶ ὥσπερ τελεώτατα τῷ σφετέρῳ. βίῳ ἀπειρηκότης· πρὸς γὰρ τοῖς ἄλλοις δεινοῖς καὶ ἅπαν τὸ ἐπιχώριον ὕδωρ, τὴν τοῦ ἀκραιφνοῦς καὶ ποτίμου φύσιν ἀθρόον ἀφηρημένον, ἐς τὸ ἀλμυρὸν ἠρέμα καὶ ἄτοπον μετεβέβλητο. καὶ ἦν ἅπαντα τὰ τῇδε φευκτὰ καὶ ἀνατετραμμένα ὥς μὴδὲν ἕτερον ὑπολελειφθαι πρὸς εὐκοσμίαν τῇ πόλει ἢ μόνον τὸ κλεινὸν τῶν Ἀσκληπιαδῶν ὄνομα καὶ τὴν ἐφ' Ἱπποκράτει μεγαλαυχίαν.

The date of the earthquake is debated. Agathias visited the area in 558, at the time of his return journey from Constantinople, but in his narrative he dates the earthquake to before the great 557 earthquake at Constantinople (see entry < 225 >). However, since he had earlier talked of the 554 earthquake at Constantinople (see entry < 219 >) before that of 551 (see entry < 218 >), it is not possible to draw many conclusions about the precise chronology. For a general consideration and further information, see Cameron (1970, p.138 ff.).

< 222 > 11 July 555 Constantinople

sources 1 Theoph. 229-30

sources 2 Cedren. 674-5

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Downey (1955); Grumel (1958); Guidoboni (1989)

Theophanes records an earthquake in the year of the world 6047 [555]: "In this year, on 11 July, in the third indiction, there was a great earthquake during the church service at St.Euphemia of the Horos. On 19 of the same month, there was thunder and lightning, and the Lips wind blew so fiercely that the cross fixed to the Gate of Rhegium fell down".

Τούτῳ τῷ ἔτει μηνὶ ἰουλίῳ ια', ἰνδικτιῶνος γ', ἐν τῇ συνάξει τῆς ἁγίας Εὐφημίας τοῦ Ὁρου, γέγονε σεισμός μέγας· καὶ τῷ αὐτῷ μηνὶ ιθ' ἐγένοντο βρονταὶ καὶ ἀστραπαὶ φοβεραὶ καὶ ἄνεμος Λιψ φοβερός, ὥστε πεσεῖν τὸν σταυρὸν τὸν ἔσωθεν ἰστάμενον τῆς πόρτης τοῦ Ῥησίου.

Theophanes does not record any damage caused by this earthquake, nor does he name any places that were affected by it, but he must surely have been referring to Constantinople, because the Gate of Rhegium is clearly a topographical reference to that city.

< 223 > 16 April 557 Constantinople?

sources 1 Mal. 488; Theoph. 231

sources 2 [Dion. Tellmahr.] 141; Mich. Syr. 2.262

literature Dagron (1974)

catalogues Mallet (1853); Grumel (1958); Hermann (1962); Guidoboni (1989)

Malalas reports that an earthquake occurred in April, but he does not say where: "In the month of April in that [sixth] indiction there was a tremendous earthquake, but it caused no damage".

Μηνὶ ἀπριλλίῳ, ἰνδικτιῶνι τῇ αὐτῇ, γέγονε σεισμός φοβερός καὶ ἀβλαβής.

Theophanes dates the earthquake to the year of the world 6049 [557], and records: "And on 16 April, on the second day [Monday], there was a violent but not destructive earthquake".

Καὶ τῷ ἀπριλλίῳ μηνὶ ις', ἡμέρᾳ β', ἐγένετο σεισμός φοβερός καὶ ἀβλαβής.

< 224 > dawn on 19 October 557 Constantinople?

sources 1 Theoph. 231

sources 2 Cedren. 675

catalogues Bonito (1691); Mallet (1853); Capelle (1924); Grumel (1958); Shebalin *et al.* (1974); Guidoboni (1989)

Theophanes records an earthquake in the year of the world 6050 [557], but gives no particular location: "In this year, on Friday 19 October of the sixth indiction, there was a great earthquake just as Saturday was dawning".

Τούτῳ τῷ ἔτει μηνὶ ὀκτωβρίῳ ιθ', ἡμέρᾳ ς', ἰνδικτιῶνος ς', γέγονε σεισμός μέγας διαφάυντος σαββάτου.

Grumel (1958, p.478) places the earthquake at Constantinople and Antioch.

(225) **the night of 14/23 December 557 •Constantinople, •Nicea?,
•Nicomedia?, •Rhegium, •Illyria**

- sources 1** Mal. 488-90; Ioh. Eph. 328-9; Theoph. 231; Agath. 5.3.1-11; *Anon. Eccl. Hist.* 114;
The Great Chronogr. 11.231; *Vita Sym. Stil. Iun.* 106; Leont. *hom.* 1 and 7
- sources 2** [Dion. Tellmahr.] 131-2; *Typicon of the Great Church*, ed. Mateos (1962, I, p.130, 13 f.);
Hymns in Follieri (1966, p.301); Cedren. 676-7; (see 677, on the St.Sophia collapse);
Mich. Syr. 310; Glyc. 269
- literature** Kumaniecki (1930); Downey (1961); McCail (1967); Van den Ven (1962, 1970); Dagron (1974);
Allen and Datema (1991)
- catalogues** Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Capelle (1924); Downey (1955);
Grumel (1958); Shebalin *et al.* (1974); Comninakis and Papazachos (1982);
Papazachos and Papazachos (1989); Guidoboni (1989)

A number of sources report this disastrous earthquake as having struck Constantinople and the surrounding area.

Agathias writes: "Not long before these events [Theodorus' victory over the Tzani] Constantinople was once more almost completely razed to the ground by a terrible earthquake. A convulsion of unparalleled magnitude and duration, its horror was further accentuated by the time of year and by the fateful and harrowing events that followed in its wake. It was in fact that time of year when autumn was drawing to a close and the traditional Roman Festival of the Names was being celebrated. The cold weather had already set in [...] Then towards midnight when all the citizens were sleeping peacefully in their beds disaster suddenly struck, and every structure was instantly shaken to its foundations. The tremors, which were violent to start with, kept growing in intensity as though rising to a catastrophic climax. Everybody was awakened and shrieks and lamentations could be heard, accompanied by the usual pious ejaculations that spring spontaneously to the lips in such moments of crisis. Each successive tremor was followed by a deep, growling sound like thunder issuing from the bowels of the earth, which doubled the general sense of terror and alarm. The surrounding air grew dim with the vaporous exhalations of a smoky haze rising from an unknown source, and gleamed with a dull radiance. Panic-stricken, the people poured out of their houses, filling the streets and alleyways, as though destruction could not overtake them just as easily out of doors as indoors. The fact is that every quarter of the city is so heavily built up that wide open spaces entirely free of obstructions are an extremely rare sight. Nevertheless their fear and anxiety of mind seemed to subside gradually at the mere possibility of somehow turning their eyes towards heaven in an attempt to propitiate the Deity. They got a slight wetting from a shower of sleet and suffered greatly from the cold, but even so they did not take shelter, with the exception of those who took refuge in the churches, prostrating themselves before the altars. Large numbers of women, and not just the members of the lower classes but even persons of breeding and distinction, roamed about and mingled freely with the men; the ordered structure of society with its due observance of decorum and respect for privilege and the proper distinction of rank was thrown into wild confusion and trampled underfoot. Slaves, in the grip of the present and more compelling fear, showed contempt for their masters and, disobeying their instructions, congregated in the places of worship. Men in authority and men of no consequence were placed on an equal footing owing to the common danger and the general prospect of imminent annihilation. During that night many houses were destroyed, particularly in the district of Rhegium, which is the port of Constantinople. Many amazing and incredible events occurred too in the course of that night. In one locality the roofs of buildings, and this was true of stone and wooden structures alike, came apart, disclosing through yawning gaps a clear vista of sky and stars, and then suddenly fell back again into place. Elsewhere pillars on an upper floor were catapulted by the force of

the convulsion and shot through the air over the tops of the nearby houses, travelling a long way before they eventually came crashing down and smashed into pieces whatever they landed on. In other places there were other still more horrifying things happening, and, though these followed an oft-repeated pattern which will recur time and again as long as this imperfect world of ours remains, yet their impact was on that occasion more shocking because they all occurred simultaneously. Large numbers of ordinary people perished in the disaster. Of the persons of rank and of those who were members of the senate the only one to lose his life was Anatolius”.

Τούτων δὲ οὐ πολλῶ ἔμπροσθεν πάλιν ἐν Βυζαντίῳ ἐξαίσιόν τι σεισμοῦ χρήμα ἐνέσκηπεν, ὡς μικροῦ ἅπασαν ἀνατετράφθαι καὶ διαρρυῆναι τὴν πόλιν. γέγονε μὲν γὰρ καὶ καθ’ αὐτὸν μέγιστος ἡλικὸς καὶ ὁποῖος, οἶμαι, οὐπώποτε πρότερον, τῇ τε τραχύτητι τοῦ βρασμοῦ καὶ τῷ μονίμῳ τοῦ σάλου. ἔτι δὲ αὐτὸν φρικωδέστερον ὁ καιρὸς ἀπείδεξε καὶ ἡ τῶν ἐπισυμβάντων ἀνάγκη. ἡνίκα γὰρ ἐκείνου τοῦ ἔτους ἡ τοῦ φθινοπόρου ἔληγεν ὥρα ἔτι τε τὰ ὑπὲρ τῶν ὀνομάτων συμπόσια ἐτελεῖτο, ἥπερ τοῖς Ῥωμαίοις νενόμισθαι, κρυὸς μὲν ἤδη ὑπῆρχεν [...] τότε δὲ ἀμφὶ μέσην τῆς νυκτὸς φυλακὴν ὕπνῳ μὲν οἱ ἄστοι εἶχοντο καὶ ἡρεμία, ἐνέπεσε δὲ ἐξαίφνης τὸ δεινόν, καὶ ἅπαντα εὐθύς ἐκ βάθρων αὐτῶν ἐδονεῖτο· ἡ τε κίνησις βιαιότατα κατ’ ἀρχὰς εἰσβαλοῦσα ἐπὶ μεῖζον ἔτι ηὔξανετο καὶ ἐπηυξάνετο, ὥσπερ ἐς ἐπιδοσὶν τινα καὶ ὑπερβολὴν τοῦ πάθους χωροῦντος. οὕτω δὲ οὖν ἀπάντων ἀφυπνισθέντων κωκυτὸς ἠκούετο πάντοθεν καὶ ὀλολυγὴ καὶ ἡ πρὸς τὸ θεῖον ἀναβοᾶσθαι αὐτομάτως ἐν τούτοις εἰωθυῖα φωνή· ἐπεὶ καὶ ἡχὸς τις βαρὺς καὶ ἄγριος, ὥσπερ χθόνια βροντή, ἐκ τῆς γῆς ἀναπεμπομένη ἐπηκολούθει τῷ κλόνῳ καὶ ἐδιπλασιάζε τὰς ἐκπλήξεις. ὁ τε περίγειος ἀῆρ ὁμίχλη καπνώδει οὐκ οἶδα ὅθεν ἀναχθείσῃ κατεμελαινέτο· καὶ ἦν ἅπας ζοφερός καὶ οἶον γεγανωμένος. τοιγάρτοι ἀλόγῳ τινὶ τὸ ἀνθρώπειον καὶ ἀνεξετάστῳ. ὑπὸ τοῦ δείματος ἐχόμενοι γνώμῃ ὑπεξήσαν τῶν οἰκημάτων. καὶ αὐτίκα αἱ τε ἀγνυαὶ καὶ οἱ στενωποὶ ἐνεπίμπλαντο τοῦ ὁμίλου, ὥσπερ οὐχὶ καὶ ἐνταῦθα ἐνόν, εἰ οὕτω τύχοι, διαφθαρέναι. ξυνεχεῖς γὰρ ἀπανταχοῦ αἱ οἰκοδομαὶ τῆς πόλεως καὶ ξυνημμέναι ἀλλήλαις καὶ σπανιαίτατα ἴδοι τις ἂν χωρίον ὑπαιθρον καὶ ἀναπεπταμένον καὶ παντάπασιν ἐλεύθερον τοῦ ἐπιπροσθοῦντος. ὁμῶς τῷ ἄνω τὰς ὄψεις ἰθύνειν καὶ τὸν οὐρανὸν ἀμωσγέπως ἐπιθεᾶσθαι οὕτω τε τὸ θεῖον ἰλάσκεσθαι, ταύτη γοῦν αὐτοῖς ἡρέμα ὑποχαλᾶν ἐδόκει τὸ δεδιδὸς τῆς ψυχῆς καὶ ταραττόμενον. καίτοι νικητῶ τε ὀλίγῳ ὑπερραίνοντο καὶ ὑπὸ τοῦ κρύους ἐπιέζοντο· ἀλλ’ οὐδ’ ὡς ὑπορόφιοι ἐγίνοντο, πλὴν εἰ μὴ ὁπόσοι ἐν ἱεροῖς ἔρκεσι καταφεύγοντες ἐκαλινδοῦντο. γυναῖκα δὲ πολλὰ, μὴ ὅτι τῶν ἡμελημένων, ἀλλ’ ἤδη που καὶ τῶν ἐντιμοτάτων, ξυνηλάτο τοῖς ἀνδράσι καὶ ἀνεμίγνυτο· τάξις τε ἅπασα καὶ αἰδὼς καὶ ἡ τῶν γερῶν μεγαλαυχία καὶ ὁ τι ἐνθένδε ὑπερανέχον καὶ ἀποκεκριμένον, ἀνετετάρακτο ἐν τῷ τότε καὶ ἐπεπάτητο. οἱ τε γὰρ δούλοι τοὺς κεκτημένους περιεφρόνουν καὶ τῶν ἐπιταγμάτων ἀνηκουστοῦντες ἐς τὰ ἱερὰ ξυνήσαν, ὑπὸ τοῦ μείζονος νικώμενοι δέους· οἱ τε ἐλάττοντες πρὸς τοὺς ἐν τέλει ἐς ἰσοτιμίαν καθίσταντο, ὡς δὲ κοινὸν ἐπιπεσόντος κινδύνου καὶ ἀπάντων οἰόμενων οὐκ ἐς μακρὰν ἀπολείσθαι. συχναὶ μὲν οὖν ἐκείνης τῆς νυκτὸς οἰκίαι καταβέβληνται, καὶ μάλιστα ἐν τῷ Ῥηγίῳ, ἐπίνειον δὲ τοῦτο τῆς πόλεως· πολλὰ τε καὶ ἄπιστα θαύματα ξυνηνέχθη. πῇ μὲν γὰρ αἱ ὀροφαί, εἴτε λίθοις εἴτε ξύλοις ἐτύγγανον ἐσκευασμένοι, διέστησαν ἀπ’ ἀλλήλων, ἀρνησάμεναι τὴν ξυνέχειαν καὶ διαχανοῦσαι, ὡς τὸν τε ἀέρα καὶ τοὺς ἀστέρας καθάπερ ἐν ὑπαίθρῳ χωρίῳ διορᾶσθαι, καὶ αὐθις ἀθρόον ἐς τὴν προτέραν ξυνήσαν ἀρμονίαν· πῇ δὲ κίονες ἐν ὑπερφῶ τινὶ δωματίῳ ἰδρύμενοι ἀνηκοντίζοντο τῇ βίᾳ τοῦ βρασμοῦ καὶ τοὺς ἐχομένους οἴκους ὑπεραλάμενοι ἐπὶ τοὺς πορρωτέρω, καθάπερ διασφενδονθέντες, ἐκ τοῦ μετεώρου κατεφέροντο καὶ ἅπαντα διερρήγνυν· πῇ δὲ ἄλλα ἄττα φρικωδέστερα ξυνέβαινε, γεγόμενα μὲν πολλάκις πρότερον καὶ αἰεὶ ἐσόμενα, ἔστ’ ἂν γῇ τε ἡ καὶ φύσεως ἀμαρτήματα, τότε δὲ κατὰ τὸ μᾶλλον ἅπαντα ἅμα ξυνενηγμένα. συχνοὶ δὲ ἄνθρωποι τεθνήκασιν τῶν πολλῶν τε καὶ ἡγνοημένων· τῶν γε μὴν δυνατῶν καὶ ἐν τῇ συγκλήτῳ βουλῇ ἀναγεγραμμένων Ἀνατόλιον μόνον διαφθαρῆναι ξυνέβη.

The earthquake is also recorded by Malalas: "In the month of December of the sixth indiction another most tremendous earthquake occurred at midnight. The two walls of Constantinople suffered, both the old one which had been put up by Constantine and the one built by Theodosius, and parts of churches collapsed; especially those on the far side of the Hebdomon. The column which was in the Secundianai was brought down, together with its statue. At Rhegium [a small town some distance west of the capital] a very large number of those who had been trapped in the rubble were rescued alive. Many parts of outlying cities also collapsed. This tremendous disaster lasted for ten days. For a time people were conscience-stricken and continued to offer prayers and supplications in the church. The emperor Justinian did not wear a crown for 30 days".

Μηνὶ δεκεμβρίῳ ἰνδικτιῶνος ς' γέγονεν ἕτερος σεισμός ἐν μεσονυκτίῳ φοβερός πάνυ, ὥστε παθεῖν τὰ δύο τεῖχη Κωνσταντινουπόλεως, τό τε παλαιὸν τὸ γενόμενον ὑπὸ Κωνσταντίνου καὶ τὸ κτισθὲν ὑπὸ Θεοδοσίου, καὶ ἐκκλησιῶν δὲ μέρη κατέπεσον, ἐξαιρέτως δὲ τὰ ἐπέκεινα τοῦ Ἑβδόμου· καὶ ὁ κίων δὲ ὢν ἐν Σεκουνδιαναῖς σὺν τῇ στήλῃ κατηνέχθη· τοῦ δὲ Ῥηγίου πάνυ πολλὰ κατέπεσον. πολλοὶ ἀπέθανον ἐν τοῖς συμπτώμασι· τινὲς δὲ καὶ μεθ' ἡμέρας ἐκ τῶν καταληφθέντων ὑπὸ τῶν συμπτωμάτων διεσώθησαν. ἐν αὐτῷ δὲ τῷ φόβῳ καὶ ἐν ταῖς ἔξω πόλεσι πολλοὶ τόποι πεπτώκασιν. ἡ δὲ αὐτὴ φοβερὰ ἀπειλὴ ἐπεκράτησεν ἐπὶ ἡμέρας δέκα· καὶ πρὸς ὀλίγον κατενύγησαν οἱ ἄνθρωποι λιταῖς καὶ δεήσεσι προσκαρτεροῦντες ἐν τῇ ἐκκλησίᾳ. ὁ δὲ αὐτὸς βασιλεὺς Ἰουστινιανὸς οὐκ ἐφόρεσε στέμμα ἐπὶ ἡμέρας τριάκοντα.

Theophanes describes the earthquake as follows: "In this year [of the world 6050, i.e. 557], on 14 December, another utterly terrifying earthquake took place, with resulting damage to both walls of Constantinople: those erected by Constantine and the others by Theodosius. Churches and other buildings beyond the Hebdomon were equally destroyed, as was St. Samuel and the church of the Theotocos at Petala and that of St. Vicentius, and many church altars and their canopies from the Golden Gate to the Gate of Rhegium. There was no place or suburb that was not reduced to ruins as a result of this terrible earthquake, and Rhegium was razed to the ground, with the result that it was unrecognisable, and the churches of St. Stratonicus and St. Callinicus at Rhegium collapsed, as did the porphyry column which stood in front of the palace of the Jucundianae. It fell with the stele on the top and penetrated 8 feet into the ground, and the column of the emperor Arcadius also fell down — the one that stood on the shield of the Taurus, and the one on the left. Many people were injured by collapsing buildings, and others who had been struck by falling buildings were rescued two or three days later. And it was reported that the same thing had happened in other cities. No such great and terrible earthquake had ever occurred on earth within living memory".

Καὶ τῷ δεκεμβρίῳ μηνὶ ιδ' γέγονεν ἕτερος φοβερός πάνυ, ὥστε παθεῖν τὰ δύο τεῖχη Κωνσταντινουπόλεως, τό τε Κωνσταντινικὸν καὶ τὸ ὑπὸ Θεοδοσίου κτισθέν. κατέπεσον δὲ ἐν ἐξαιρέτῳ ἐκκλησίαι καὶ τὰ ἐπέκεινα τοῦ Ἑβδόμου καὶ ὁ ἅγιος Σαμουὴλ καὶ ἡ ἁγία Θεοτόκος τῶν Πεταλᾶ καὶ τοῦ ἁγίου Βικεντίου καὶ πολλὰ θυσιαστήρια ἐκκλησιῶν καὶ κιβώρια, ἀπὸ τῆς Χρυσῆς πόρτης ἕως τοῦ Ῥησίου· καὶ οὐκ ἦν τόπος ἢ προάστειον, ὃ οὐκ ἔπεσεν ἀπὸ τῆς φοβερᾶς ἀπειλῆς τοῦ σειсмоῦ. τὸ δὲ Ῥήγιον οὕτως ἔπεσεν ἕως ἐδάφους, ἔστε μὴ γνωρίζεσθαι αὐτό. ἔπεσε δὲ καὶ ἡ ἐκκλησία τοῦ ἁγίου Στρατονίκου καὶ Καλλινίκου ἕως ἐδάφους, αἱ οὔσαι ἐν τῷ Ῥηγίῳ. καὶ ὁ κίων δὲ ὁ πορφυροῦς, ὁ ἐστὼς ἔμπροσθεν τοῦ παλατίου Ἰουκουνδιανῶν μετὰ τῆς ἐπικειμένης αὐτῷ στήλης ἔπεσε καὶ ἐπάγη εἰς τὴν γῆν πόδας ὀκτώ. ἔπεσε δὲ καὶ ἡ στήλη Ἀρκαδίου τοῦ βασιλέως ἢ εἰς τὴν ἀψίδα τοῦ Ταύρου, ἢ εἰς τὸ ἀριστερὸν μέρος ἐστῶσα. καὶ πολλοὶ ἔπαθον ἐν τοῖς συμπτώμασιν, ἕτεροι δὲ καὶ μεθ' ἡμέρας ἐκ τῶν καταληφθέντων ὑπὸ τῶν συμπτωμάτων διεσώθησαν μετὰ δύο καὶ τρεῖς ἡμέρας.

ἠκούσθη δὲ ὅτι καὶ ἐν ἑτέραις πόλεσι τὸ αὐτὸ γέγονεν· τοιοῦτον γὰρ μέγαν καὶ φοβερόν σεισμόν οὐ μέμνηται ἄνθρωπος ἐπὶ τῆς γῆς ἐν τῇ γενεᾷ ἐκείνῃ.

The *Life of St. Symeon the Stylite the Younger* tells how, nine days after Syria was struck by a seismic sea-wave, St. Symeon appeared in Constantinople, where he had a vision of an impending earthquake: "Six days later, during the night, there was a great earthquake at Constantinople. In some districts a large number of houses partly collapsed, and many people were killed. Nicomedia was also destroyed, as well as the place called Rhegium, part of Nicea and the other cities of Illyria. There was great dismay at Antioch when the news was heard, and people prayed day and night".

Καὶ μεθ' ἡμέρας ἕξ ἐγένετο ἐν νυκτί σεισμός μέγας ἐν Κωνσταντινουπόλει, καὶ κατὰ ρεγῶνας κατεστράφησαν ἐν μέρει οἱκοι πολλοὶ καὶ ἀπώλετο πολὺς λαὸς ἐν αὐτῇ κατεστράφη δὲ καὶ Νικομήδεια καὶ τὸ λεγόμενον Ῥήγιον, Νίκαια δὲ ἀπὸ μέρους καὶ αἱ λοιπαὶ πόλεις αἱ πλησίον τοῦ Ἰλλυρικοῦ. Ἐγνώσθη δὲ ταῦτα ἐν Ἀντιοχείᾳ τῇ πόλει καὶ ἐγένετο πένθος ἐν αὐτῇ, καὶ ἐλιτάνευον νυκτὸς καὶ ἡμέρας.

The reference to Nicomedia and Nicea might suggest that the Constantinople earthquake was the one which occurred in 554 (see entry (219)), but that leaves the references to Illyricum unexplained. Moreover, as Van den Ven (1970, p.107) has pointed out, reference to the small town of Rhegium is found in both Agathias and Malalas, and would suggest dating the earthquake to 557.

Cedrenus records a destructive earthquake at Constantinople in the thirty-first year of the reign of Justinian I [557]: "In the thirty-first year [of the reign of Justinian] there were various other earthquakes, which affected the two walls of Constantinople to east and west, and many churches and houses collapsed. So did many outlying districts and Rhegium, with the result that they were rendered unrecognisable. Other cities were also affected by this earthquake, which was the strongest within living memory, and the earth was shaken continuously by day and night for ten days. The emperor, too, was plunged into grief by the disaster, and appeared on Christmas Day and Epiphany without his crown".

Καὶ τῷ λα' ἔτει ἐγένοντο πάλιν σεισμοὶ διάφοροι, ὥστε παθεῖν τὰ δύο τεῖχη Κωνσταντινουπόλεως, τὸ ἀνατολικὸν καὶ τὸ δυτικόν, καὶ πολλὰ ἐκκλησίαι καὶ οἱκοι ἕως ἐδάφους κατέπεσον. ἀλλὰ μὴν καὶ τὰ προάστεια καὶ τὸ Ῥήγιον. ὥστε μὴ γνωρίζεσθαι. καὶ ἐν ἄλλαις δὲ πόλεσιν ἐγένετο ὁ σεισμός οὗτος, οἷον οὐκ ἐμνημόνευσεν ἄνθρωπος ἐν ταῖς γενεαῖς ἐκείναις. καὶ ἐσείετο ἡ γῆ μετὰ φιλανίας ἐν νυκτί καὶ ἡμέρᾳ ἐπὶ ἡμέρας δέκα. διὸ καὶ λυπούμενος ὁ βασιλεὺς εἰς τὰ γενέθλια καὶ θεοφάνια χωρὶς στέμματος προῆλθε.

One of the delayed effects of this earthquake was the sudden collapse of the dome of St. Sophia in May 558. The occurrence is reported by Malalas, the *Anonymous Ecclesiastical History*, The Great Chronographer, Pseudo-Dionysius of Tellmahre (who dates it to 555/556), Theophanes and Cedrenus.

A monody was composed on the occasion of this earthquake. The text was published by Kumaniecki (1930), and the author may have been Procopius. Allen and Datema (1991) have suggested that there are allusions to this earthquake in *Homily 1* and *Homily 7* by Leontius of Constantinople.

Capelle (1924, col.347) dates the earthquake to 559. Downey (1955, p.598) uses the *Synaxarium Ecclesiae Constantinopolitanae* 308.29-32 to confirm the date of the earthquake as 14 December. He also thinks (1961, p.558) that the walls of Antioch collapsed as a result of this earthquake rather than in 551 (see entry (218)); but he does not seem to have given sufficient consideration to the problems of handling a hagiographical source.

[Antioch] and the suburb of Daphne, precisely at noon. The tremors caused the total destruction of Daphne, whereas public and private buildings in Theopolis, though badly damaged, were not totally destroyed”.

Ἀνὰ δὲ τὴν Θεουπολιτῶν, καὶ τὴν γείτονα Δάφνην, Τιβερίου Καίσαρος τρίτον ἔτος τὴν βασιλείαν διακυβερνῶντος, κλόνος τε τῆς γῆς γέγονεν ἐξαίσιος ἐξ αὐτὸ τῆς μεσημβρίας τὸ σταθερώτατον, ὅτε καὶ σύμπασα Δάφνη τῶν σεισμῶν ἔργον γέγονε, τῶν ἐν Θεουπόλει δημοσίων καὶ ιδιωτικῶν οἰκοδομιῶν διαρραγείσων μὲν μέχρι τῆς γῆς αὐτῆς.

〈228〉 **10 May 583 Constantinople**

sources 1 Theoph. Sim. 1.12.8-11; Theoph. 252

sources 2 Cedren. 691.17

literature Dagron (1981); Whitby e Whitby (1986)

catalogues Mallet (1853); Capelle (1924); Downey (1955); Grumel (1958); Hermann (1962); Guidoboni (1989)

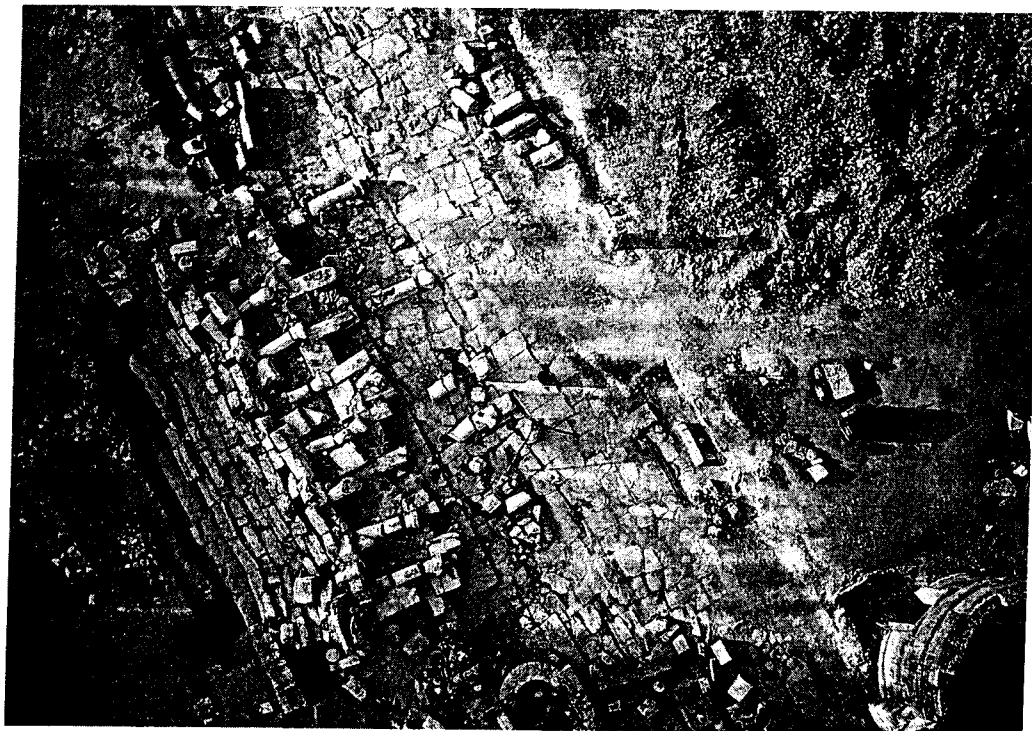
Theophylactus Simocatta is the first author to provide evidence of this earthquake: “When the spring of the past year was in its prime and covering the earth with green growth, on the anniversary day for the dedication of the city (this was the first year of the emperor’s reign [11 May 583]), a terrestrial affliction arose, and a very great earthquake persisted, as if the earth were leaping from its very foundations. I will not discuss its cause, since the Stagirite [Aristotle] has devoted considerable thought to this subject; if his account appears plausible to anyone, let him be praised for his cleverness, but if not, let the doctrine be returned to its father for fostering. Accordingly, as day was waning, the earth’s axis was shaken and there was extraordinary panic, so that even the racing fanatics were suddenly converted by fear to prudence, just like children playing at dice on the surprise appearance of their teacher, and the banner outside the arena for the equestrian contests, which was in fact a signal for rejoicing, was removed on account of the unexpected danger, and it came about that all men, in terror of death, took sanctuary in the holy precincts”.

Τοῦ δὲ διεληλυθότος ἐνιαυτοῦ ἡρος ἀκμάζοντος καὶ κατακομῶντος τὴν γῆν, ἐν τῇ ἐγκυκλίῳ τῶν ἐγκαινίων ἡμέρα τῆς πόλεως (πρῶτον δὲ τοῦτο ἔτος τῆς βασιλείας τοῦ αὐτοκράτορος) πάθος γῆς ἀνεφοίτησε καὶ μέγιστος σεισμός ἐνηδήμησεν, οἷα τῆς γῆς παρασκιρτώσης ἐκ πυθμένων αὐτῶν. τὸν δὲ λόγον οὐ δίδειμι. τῷ γὰρ Σταγειρίτῃ οὐκ ὀλίγα ἄττα περὶ τούτου πεφιλοσόφηται, καὶ εἰ τῷ λέγων πιθανὸς φανεῖται, ἐπανείσθω τῆς εὐφυΐας, εἰ δὲ μή, τῷ γε πατρὶ ἀποπεμπέτω περιθάλλειν τὸ δόγμα. τοιγαροῦν ἡμέρας κλινούσης ἐδινεῖτο τὸ κέντρον, καὶ ὁ φόβος ἐξαίσιος ἦν, ὥς καὶ τοὺς ἵππομανοῦντας ὑπὸ τοῦ δέους ἀθρόον μεταβάλλεσθαι πρὸς τὸ σῶφρον, δίκην παίδων ἐν παιδιᾷ κύβων ἀφικομένου ἐξαπινάϊως τοῦ παιδοτρίβου, τό τε παραπέτασμα τὸ πρὸ τοῦ γυμνασίου τῶν ἱππικῶν ἀγωνισμάτων, ὃ δὴ σύνθημα τῆς ἰλαρίας ἐτύγγανεν ὄν, περὶ αἰρεῖται διὰ τὸν ἀδόκητον κίνδυνον, ἅπαντας τε συνέβαινε πρὸς τοὺς ἱεροὺς σηκοὺς ἐντεμενίζεσθαι ὀρρωδοῦντας τὸν θάνατον.

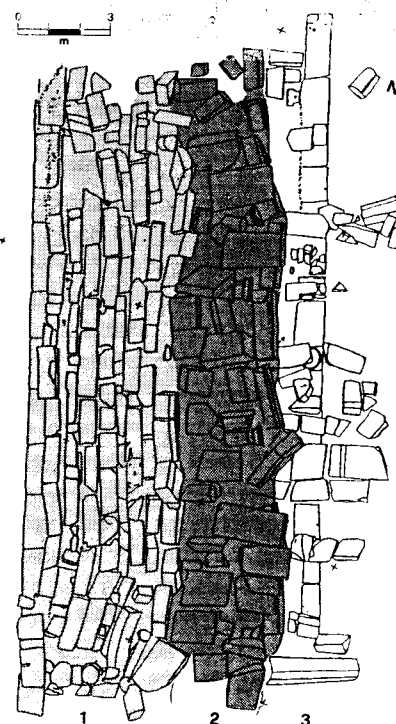
Theophanes also records this earthquake and dates it to the year of the world 6075 [583]: “And on 10 May there was a violent earthquake and everyone took refuge in church, and the horse races for the “birthday” of Constantinople [11 May] were not held”.

Καὶ τῇ ι' τοῦ μαΐου μηνὸς γέγονε σεισμός μέγας, καὶ πάντες κατέφυγον εἰς τὰς ἐκκλησίας, καὶ τὸ γενέθλιον ἱππικὸν οὐκ ἐπετελέσθη.

Theophylactus dates the earthquake to the day when the dedication of the city was celebrated (11 May), whereas Theophanes gives 10 May 583. It seems preferable to

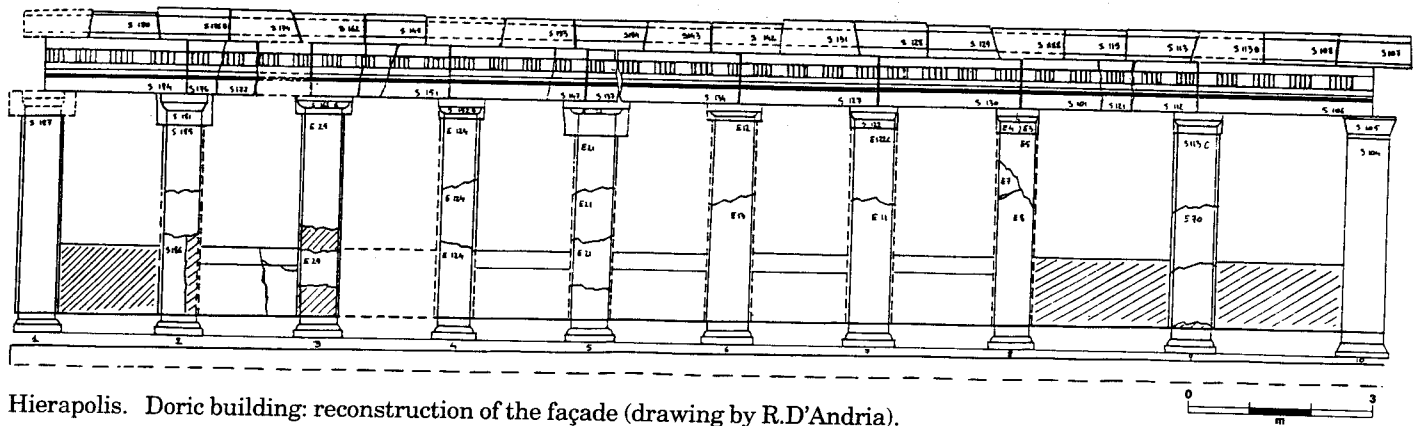


Hierapolis. "Street of Frontinus": on the left can be seen the collapsed Doric building (photo taken from a balloon in September 1992 by J.Devreker).



1: collapsed rear wall. 2: collapsed roof and central colonnade. 3: collapsed Doric façade (drawing by R.D'Andria).

Turkey), under the direction of F.D'Andria of the University of Lecce and under the auspices of the Italian Archaeological Mission in Turkey. The excavations have brought to light the principal north-south street and, to the east of it, the vast flat area of the commercial agora, surrounded by 2nd century AD. marble porticoes (De Bernardi Ferrero 1993, pp.157-8). Archaeological research in this area, involving the study of certain building collapses, has made it possible to establish important data concerning earthquakes which struck the city in the late antique and Byzantine periods. Along the east side of the first part of the plateia (which can be identified from inscriptions as the "street of Frontinus"), a totally collapsed building covering an area of about 264 square metres has been found. The collapse can definitely be attributed to an earthquake. The building was made of dressed blocks of local travertine, and measured 7.70 m in breadth by 24 m in length. It has been identified as a commercial warehouse, and on the basis of stratigraphic and epigraphic evidence can be dated to the end of the 1st century AD. The building was divided lengthwise by a Doric entablature. The roof consisted of two rows of stone blocks arranged lengthwise, and it rested on the end wall, the architrave of the central colonnade and the Doric façade. Since the collapse is in a perfect state of preservation, it is possible to see that the building fell along the front, partially blocking the street. It can be observed in particular that the back wall fell against the central colonnade, which fell against the façade; and even the heavy stone roof blocks were pushed violently forward. When the half columns of the façade were removed, an important piece of chronological evidence was revealed, for painted in red on a white lime wash were three acclamatory inscriptions to the emperor Justinian (527-565), which provide a terminus post quem for the earthquake. Hidden by the collapse were strata relating to a fire, containing grooved pottery typical of the 5th and 6th century AD., as found inside many other buildings at Hierapolis. In collapsed houses along the "street of Frontinus" and also in the house to the west of the theatre, the same kind of pottery is found alongside coins of Justinian, Justin II (565-578) and Maurice Tiberius (589-590). The latest coin found in these collapses belongs to the reign of the emperor Phocas, and has been



dated to 602-603 (HS H88-286). The earthquake responsible for the destruction of the whole city can therefore be dated to the early 7th century AD.; and it also caused the Byzantine fortified (north) wall to collapse outwards. The 5th and 6th century AD. pottery dumped at the foot of the wall appears to have been covered by the wall's collapse. There are numerous large lesions and split stone blocks in the Byzantine wall resulting from the violence of the earthquake.

sources 1 Ibn Baṭrīq, *al-Ta'rīkh*, 210-1

Ibn Batriq (Eutychius) records an earthquake which caused destruction and deaths in Syria and in the neighbouring parts of the Byzantine Empire: "In the nineteenth year of his reign [that of Maurice] there was another violent earthquake in the territory of Rum [Cilicia] and in Syria towards the third hour of the day. Many cities were destroyed in Syria and in the territory of Rum, and the earthquake caused the death of many people".

The earthquake frequently appears in the bibliography of seismology, where it is given the generic location of the district of Taron (Abich 1882; Step'anyan 1964; Kondorskaya and Shebalin 1977; Ambraseys and Melville 1982, on p.36 they give the year as 601; and Karapetian 1991, no.4). See also Kostaneanc' (1902, pp.6 and 16). Pseudo-John Mamikonean records: "In that year, the [Monastery of the Holy] Karapet, which was in Innaknean, collapsed in ruins, for there was a very severe earthquake; and the houses below it were [also] destroyed. Because the foundations of the church stood in the earthquake area, it shifted and collapsed in ruins".

ի սոյն ամի Կարապետն, որ յինսականեանն էր, փլաւ, զի շարժ խիստ եղել:

(The Armenian text printed in the critical edition does not include the details about the collapses. These were established by Avdoyan 1985 from unpublished manuscripts).

The date can be deduced from the beginning of the paragraph ("in the first year of the reign of P'oukas [the Byzantine emperor Phocas = 602-603 A.D.]").

Some scholars have expressed doubts as to whether this earthquake really occurred — the most recent of these being Avdoyan (1985, p.361ff.) — on the grounds that the present remains of the church cannot date to earlier than the 8th century. However, research into the terrain and the church itself have shown that the church was in fact rebuilt earlier than that, so there is no need to reject Pseud-John Mamikonean's statement (see Thierry 1983, p.390).

According to Abich (1883), Samuel of Ani records a seismic event in 593, but in fact the latter simply writes "many deaths" (սէսսէս մահք) for the year 606. Perhaps Abich or his informant had at their disposal a different Samuel of Ani manuscript which provided more detailed information about this event. In any case, the date remains debatable.

Ambraseys and Melville (1982, p.36) have also taken into consideration the information provided by Michael the Syrian, who does indeed speak in vague terms of earthquakes in the eastern region of the Byzantine Empire. It is by no means certain, however, that there is a link with this earthquake.

The monastery of Surb Karapet (Karapeti vank') or convent of the new springs (Innankneani vank') was situated in the mountains to the NW of Mus (present-day Mt.Bazmasar, 2150 m). It was the most important religious centre in the canton of Taron, and an important place of pilgrimage for all Armenians. The monastery was rebuilt on a number of occasions and is now in ruins, but its architectural history can be reconstructed, especially from the 15th century onwards. The earliest monastery buildings of which we now have evidence belong to the 7th or 8th centuries, from which we can deduce that it was an earlier monastery which was razed to the ground by the earthquake.

(234) the early afternoon of 20 April 611 Constantinople

sources *Chron. Pasch.* 383

catalogues Mallet (1853); Downey (1955); Grumel (1958); Guidoboni (1989)

The *Chronicon Paschale* records an earthquake at Constantinople, which probably caused a great deal of alarm but no damage, in the first year of the reign of Heraclius, in the fourteenth indiction [611]: "In this year in the month of Xanthicus, on 20 April according to the Romans, a Tuesday, at the 7th hour, there occurred a great earthquake, with the result that before Pentecost on the 22nd of the same month, a Thursday, it was necessary for a litany to be held in the Campus and the Trisagion to be chanted".

Τούτῳ τῷ ἔτει μηνὶ ξαντικῷ, κατὰ Ῥωμαίους ἀπριλίου κ', ἡμέρᾳ γ', ὥραν ζ', γέγονε σεισμός μέγας, ὡς ἐξ ἀνάγκης πρὸ Πεντηκοστῆς τῇ κβ' τοῦ αὐτοῦ μηνός, ἡμέρᾳ ε', λιτὴν γενέσθαι εἰς τὸν Κάμπον καὶ ψαλθῆναι τὸ Τρισάγιον.

There is no other source for this earthquake.

<235> **6? August 618 Rome**

sources 1 *Lib. Pont.* 1.110 and 319

sources 2 *Gesta Episc. Neapol.* 414; Paulus Diac. *Hist. Lang.* 4.47; Herimann. Augiens. *Chron.* 92; Marian. Scot. 543; Sicard. Cremon. 147; Ioh. de Deo, *Chron.* 314; Andreas Dandulus, *Chron.* 92; *Chron. B* 329; Giacomo Malvezzi, *Chron. Brix.* 831; Bartolomeo Sacchi, *Lib. de vita Chr.* 102
 literature Bardi (1581 a, b); Duchesne (1886); Molin and Guidoboni (1989); Marmo (1989 b); Budriesi (1989)
 catalogues Manetti [1457]; Filippo da Secinara (1652); Bonito (1691); von Hoff (1840); Mallet (1853); Perrey (1848); Baratta (1901); Galli (1906); Grumel (1958); Carrozzo *et al.* (1973); Guidoboni (1989); Alexandre (1990)

The earthquake in Rome in 618 is recorded both in the *Editio secunda* of the *Liber Pontificalis* (I, p.319) and in the *Abbreviatio cononiana*, in the life of Pope Adeodatus I (*Deusdedit*). According to Duchesne (1886, pp.LXVII, CCXXXII and *Lib.Pont.* I, p.319, note 2), the author of the life of Pope Adeodatus I was a contemporary of his, and therefore probably witnessed the earthquake: “during the papacy of Adeodatus, a violent earthquake occurred in the month of August in the sixth indiction. This was followed by an outbreak of scabies which proved a great scourge amongst the populace, and no-one could recognise the dead, even in his own family”.

Eodem tempore [pontificis Deusdedit] factus est terrae motus maior mense augusto, indictione vi. Post haec secuta est clades in populo, percussio scabearum, ut nullus poterat mortuum suum cognoscere.

Although the *Abbreviatio cononiana* (I, p.110) derives from the the above text, it gives a different date for the earthquake: instead of providing the indiction number (*indictione vi*), it gives the actual date when the earthquake occurred: *viii id. aug.* — i.e. 6 August. This last piece of evidence would allow us to date the earthquake more precisely, were it not for the fact that it has to be treated with great caution, since the earliest manuscripts of the *Editio secunda*, which, in the view of the scholar who published them (*Lib.Pont.* I, p.283, note 15), are chronologically more reliable, make no mention of it.

The earthquake is not recorded in the *Liber Pontificalis* as having caused damage, but it was frequently referred to, and misunderstood, in the medieval historiographical tradition. As Marmo's analysis (1989 b, pp.286-92) has shown, this earthquake lies behind a number of false earthquakes which have penetrated the historical earthquake tradition. Behind all of them lies the only report we have of an earthquake in the 7th century — namely that reported in the *Liber Pontificalis* for the year 618. As time has passed, however, the original source has receded further and further into the background, and the text has been so transformed that date and location have been altered, thus producing an uncontrolled proliferation of bogus earthquakes. Characteristic of the text of the *Liber Pontificalis*, nevertheless, is that a series of disasters is reported, but behind all the metamorphoses which have taken place, we can still recognise the essential nature of the original source.

The *Liber Pontificalis* was a source for many medieval chroniclers and historians of later centuries, and for the most part they quoted its text verbatim, adding detail to the chronological reference to the papacy of Adeodatus I. In the anonymous first part of the *Gesta episcoporum Neapolitanorum* (p.414), for example, which dates to the end of the 8th century or the beginning of the 9th, we are told that “at the time of

Adeodatus there was a great earthquake in the month of August, in the sixth indiction. This was followed by a great disaster in that the people were so afflicted by an outbreak of scabies that no-one could recognise the dead, even in his own family”.

Deusdedi temporibus factus est terremotus maior mense Augusti indictione 6. Post haec secuta est clades magna in populo percussio scavearum, ut nullus potuisset mortuum suum agnoscere.

Others, like Herimannus Augiensis, who began his chronicle in about 1048, specified the year, presumably deducing it from the indiction cycle number. However, no-one bothered to indicate where the earthquake occurred, with the sole exception of Paul the Deacon, who was writing his *Historia Langobardorum* towards the end of the 8th century, and who sets in motion a series of changes to the reporting of the earthquake of 618. The principal differences between his text and that of the *Liber Pontificalis* lie in a number of additions he has made: he adds the name of the town where the earthquake occurred, deducing it from the place where his source was written. In this way he anchors the earthquake in space; and he adds to it a great flood, as well as explaining that people could not recognise the dead even amongst their own relatives because scabies had caused extreme swelling of their faces: “At that time there was a great earthquake in Rome, and a great flood. After this there was an outbreak of scabies, such that no-one could recognise even the bodies of their relatives, because of the inflammatory swellings”.

Eo tempore magnus Romae terrae motus factus est, magnaue tunc fuit inundatio aquarum. Post haec fuit clades scabearum, ita ut nullus potuisset mortuum suum agnoscere propter nimium inflationis tumorem.

The addition of the flood is a typical example of the widespread early medieval historiographical habit of bringing together natural disasters — a tendency which was to lead to the *Libri prodigiorum* of the 16th century. The original information about the *magna inundatio* is in fact quite separate from that concerning the earthquake. It, too, comes from the *Liber Pontificalis* (I, p.317), but concerns something which happened during the papacy of Boniface IV, who was on the papal throne immediately before Adeodatus I. Thus the author of the life of Boniface IV records: “famine, plague and severe floods” (*famis, pestilentiae et inundationes aquarum gravissimae*).

One might think, however, that there was a real relationship of cause and effect between earthquake and plague, in that the earthquake could produce a deterioration in hygienic conditions. But though such a hypothesis might be plausible as regards the *Liber Pontificalis*, it certainly has to be rejected as regards Paul the Deacon, since he was so far removed from the events he describes. The most striking characteristic of what he writes is the relationship he establishes between different natural disasters. The impression he is trying to create is that of a particularly unfortunate concatenation of circumstances for the human race and, in particular, for Rome at the time when it was a prey to the expansionist policy of Rothari.

No less important than Paul the Deacon's additions to the *Liber Pontificalis* are his omissions. The most fundamental of these is certainly the date, which was expressed in the *Liber Pontificalis* in terms of indiction cycles and therefore depended on one's being able to identify the cycle concerned. This was made possible by the reference to the papacy of Adeodatus I, using the expression “*eodem tempore*”. Paul the Deacon, however, completely removes the specific chronological indication (*mense augusto, indictione vi* — *Liber Pontificalis*, I, p.110), preserving only the expression “*eo tempore*”. But the context in which this expression appears is naturally different from that in the *Liber Pontificalis*, since it is concerned with Rothari's military campaigns against the Byzantines in Friuli and Emilia. It was probably Paul the Deacon's interest in these political and military events which caused him to move natural disasters, and

bring them together to the mid-8th century; for, as often happens in early medieval historiography, natural phenomena are seen as foreshadowing crises in human affairs (though Paul the Deacon is not specific about this).

The result of Paul the Deacon's "manipulation" of the text of the *Liber Pontificalis* is to produce something rootless, a collection of disasters which is without any chronological framework, and can be adapted to any narrative requirements. So it turns up again — now dated to the mid-7th century — in 13th century chronicles, such as that of Bishop Sicard of Cremona (p.147) and of Johannes de Deo (p.314). And the earthquake is again reported in the 15th century, in the *Chronicon Brixianum* of Giacomo Malvezzi, where it is still linked to the anti-Byzantine expansionist activities of Rothari, but without a location (col.831). It is now not difficult to understand how a reported earthquake can multiply as it passes from one chronicler to another, and how, at the same time, the report can be deprived of informative content and end up as a whole series of earthquakes, all deriving from a single occurrence documented as belonging in the 7th century. A much more difficult task is to identify in detail the channels through which the various metamorphoses of the original report have been independently transmitted. In a few cases, however, it can be done.

Our earthquake is dated to the year 637 by Marcello Bonito, who was responsible for a monumental collection of reports of earthquakes published in 1691 (p.354), and to the year 624 by Girolamo Bardi, a 16th century chronologer (1581 a, p.196), who places it in Tuscany. In the first case, we can identify the source as the *Historia Langobardorum* (4.47) of Paul the Deacon. And it is also very likely that we are dealing with the same earthquake in the second case, since Bardi mentions Book iv of Paul the Deacon's work amongst his sources for that year. The fact that he places it in Tuscany may perhaps be explained as a piece of fairly local patriotism on the part of Girolamo Bardi, who was a Florentine.

We can also recognise the earthquake of 618 in the few lines which Bardi devotes to an earthquake in 677 in Rome in another work of his, the *Cronologia Universale* (1581 b, p.169). Once again it is the earthquake-plague connection which gives it away: "Very severe earthquakes were felt in Rome, and the plague caused great damage in Italy, and especially in Rome".

<236> September 634 • Jerusalem, Palestine

sources Theoph. 336; Mich. Syr. 414; al-Makīn, *Ta'rikh* 19

literature Ho Peng Yoke (1962); Russell (1985); Yeomans (1991)

catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Sieberg (1932 a); Amiran (1950-51); Grumel (1958)

Theophanes records an earthquake which struck Palestine; and he associates it with the appearance of a comet, in the year of the world 6124, that being the twenty-third year of the reign of Heraclius [632 A.D.]: "Then in that same year an earthquake struck Palestine, and a sign, called a meteor, appeared in the southern sky, foretelling Arab domination. It lasted for thirty days, and stretched from the south to the north. It was in the shape of a sword".

Αὐτῷ δὲ τῷ χρόνῳ σεισμὸς ἐγένετο κατὰ τὴν Παλαιστίνην· καὶ ἐφάνη σημεῖον ἐν τῷ οὐρανῷ κατὰ μεσημβρίαν, ὁ λεγόμενος δοκίτης, προμηνύων τὴν τῶν Ἀράβων ἐπικράτησιν· ἔμεινε δὲ ἡμέρας λ' διατείνων ἀπὸ μεσημβρίας ἕως ἄρκτου. ἦν δὲ ξιφοειδής.

This seems to be the same earthquake recorded by Michael the Syrian: "There was a severe earthquake at that time, and at the moment of the tremor, the sun grew dark. The church of the Resurrection and that of the Golgotha and many places collapsed in

Γέγονε δὲ αὐταρχοῦντος τοῦ Κωνσταντος κλόνης τῆς γῆς, καὶ πολλαὶ χῶρας τῆς Ῥωμαίων ἡγεμονίας κακῶς ἔπαθον, καὶ πνεῦμα βίαιον ἔπνευσεν ἄλλοτε, καὶ πολλὰ τῶν οἰκοδομημάτων κατέβαλε.

◁239◁ second half of the 7th century Sicily ▷eruption of Vulcano▷

sources Adamn. *De locis sanctis* 296

catalogues **Mercalli (1883); Guidoboni (1989)**

In his *De locis sanctis* (written at the dictation of Bishop Arculf around the year 688), Adamnan records prolonged eruptions of Vulcano, accompanied by earthquakes which affected eastern Sicily; but he does not give a date: "In the eastern stretch of the Great Sea, 12 miles from Sicily, there is an island on which Mt. Vulcano roars so thunderously every day and night that the land of Sicily some distance away is thought to shake with dreadful tremors; but it seems to do so particularly on the sixth day [Fridays] and on Saturdays. Flames can be seen coming from it throughout the night, and smoke by day. I wrote about that mountain at the dictation of Arculf, for with his own eyes he saw it burning by night and smoking by day; and with his own ears he heard its thunderous noise, when he was a guest in Sicily for a few days".

Quaedam insula in mari magno habetur ad orientalem plagam xii milibus a Sicilia distans, in qua Vulcanus mons quasi tonitruum totis diebus et noctibus in tantum intonat, ut Siciliae terra longius positae terrifico tremore submoveri putetur; sed maius sexta feria et sabbato intonare videtur. Qui omni tempore noctibus flammare monstratur, diebus vero fumare. Haec mihi Arculfus scribenti de eodem dictavit monte, qui propriis illum oculorum aspexit obtutibus noctu ignitosum, die vero fumosum; eius quoque tonitrualem sonitum propriis aurium audivit auditibus in Sicilia per aliquot hospitatus dies.

〈240〉 June 659 ●Palestine, ●Syria

sources *Chron. Maron.* 70; *Theoph.* 347; *Elias Nisib. Syr.versio* 140-1

literature Russell (1985)

literature
catalogues

Russek (1988);
Bonito (1991); Mallet (1953); Schmidt (1881); Sieberg (1932 a); Amiran (1950-51);
Grumel (1958); Ben-Menahem (1979); Guidoboni (1989) .

The Maronite Chronicle, a Syriac source, reports a violent earthquake in Palestine: “In 970 [of the Greeks; i.e. 659 A.D.], the seventeenth year of the reign of Constans, there was a violent earthquake in the region of Palestine, at the second hour on a Friday in the month of Haziran [June]. Many places collapsed”.

[illegible]

According to Theophanes, the earthquake also struck Syria in the seventeenth year of the reign of Constans II [658-659 A.D.]: “In this year there was also a violent earthquake which caused destruction in Syria and Palestine. It happened in the month of Daesius [in the second indiction]”.

Γέγονε δὲ καὶ σεισμὸς μέγας ἐν τούτῳ τῷ χρόνῳ καὶ πῶσις ἐν τε τῇ Παλαιστίνῃ καὶ Συρίᾳ μηνὶ δαισίῳ Ἰνδικτιῶνος β'.

Daesius was the Macedonian month corresponding to the Attic Thargelion (May/June; Russell 1985, p.47).

Elias of Nisibis, dates the earthquake to June 659: "The 39th year [of the Hegira]

catalogue 634-659 A.D.

the thirty-ninth (bishop). He was very patient, humble and gentle. In his time, the Basilica Petriana collapsed in an earthquake after the celebration of mass on a Sunday”.

Iohannes XXXIX. Hic patientissimus fuit, humilis et mansuetus. Istius temporibus ecclesia Petriana cecidit terraemotu post expleta solemnia missarum die dominico.

Then, in chapter 155 (p.378), Andreas Agnellus records that in the time of archbishop Sergius: “Aistulf decided on his own initiative to rebuild the Basilica Petriana, which had been completely destroyed in an earthquake, and he erected the bases and columns round the outside, which remain to this day, but he did not complete the work”.

[Austulphus rex] Ecclesiam Petrianam, quae funditus eversa est per terraemotum, sponte haedificare voluit, et piramides per in girum erexit, columpnas statuit, quae manent usque nunc, sed non cunsummavit.

Two churches were damaged in the earthquake. One was the church of S.Martino in Cielo Aureo at Ravenna, which had been founded by Theodoric and is now called Sant’Apollinare Nuovo. It had been reconsecrated and decorated with new mosaics and marble by bishop Agnellus in the second half of the 6th century (*Lib. Pont. Eccl. Rav.*, pp.334-5). The other was the Basilica Petriana at Classe, which had been named after its founder, Peter I Chrysologus, who was bishop of Classe at the time of Galla Placidia (*Lib. Pont. Eccl. Rav.*, p.289).

The Basilica Petriana no longer exists, but as a result of investigations by G.Cortesi in 1960 (see fig.174 in Budriesi 1989, p.378), an attempt has been made to establish its plan. Andreas Agnellus writes that the building collapsed in an earthquake which occurred after mass on a Sunday, and that it was rebuilt when Aistulf entered Ravenna in 751, at the time of archbishop Sergius. Andreas Agnellus was writing in the late 830s (Lamma 1960, p.429) and could still see remains of the old church within the reconstructed building, which was then incomplete and must have remained so for a long time, since both Pope Alexander III in 1169 and Pope Urban IV in 1262 speak of “defending” (i.e. consolidating) the Basilica Petriana. Nothing more was heard of the church until in 1875 G.Berti suggested that it had stood not far from the church of San Severo. Investigations carried out in 1960 established the shape of the church. It proved to be even larger than the Ursian cathedral in Ravenna, and it has been suggested that the central nave ended in a large apse. Earthenware pipes were found in the apse area, and they have been interpreted as evidence that the apse existed at the time when the church collapsed.

As regards the church of Sant’Apollinare Nuovo (see Budriesi 1989, p.379), the Ravenna *Liber Pontificalis* states that the apse collapsed in the above earthquake. It had been thought that only the apse roof had been damaged at that time, since Andreas Agnellus mentions a mosaic inscription above the apse windows. But it has also been suggested that the apse itself was badly damaged in the earthquake, and was already in danger of collapse at the time of Andreas Agnellus.

Recently, however, doubts have been expressed as to whether the inscription read by Andreas Agnellus really dated to the time of Theodoric. Since it includes the name of Theodoric, it is unlikely that it could have survived the “*damnatio memoriae*” for which archbishop Agnellus was responsible (Fiaccadori 1977, p.166 *passim*) and which, in the case of this church, involved the rest of the mosaic surface.

Details of the earthquake damage repairs at Sant’Apollinare Nuovo are not known. It has been suggested, however, that king Aistulf himself not only saw to the Basilica Petriana but also took responsibility both for restoring the apse of Sant’Apollinare Nuovo and — as part of a broader political policy — for putting back in place the inscription which recorded his having founded the church (Fiaccadori 1977, pp.173-9).

It is worth noting, at any rate, that the rest of the church did not suffer any substantial damage, and that not even the mosaics on the side walls came to any harm, for the scenes of miracles and of Christ's Passion, which date to the time of Theodoric, have survived almost intact.

The only point of reference we have for dating this earthquake is John V's reign as bishop, but even that is much debated by scholars. However, it seems to have been round about the years 725-744. For the complex problems involved in dating John V's reign as bishop, see Budriesi (1989, p.377, note 30).

<246> 735 ●●Vayoc' Jor >landslides<

sources 1 Mos. Dasxur. 3.17; Orb. 31

sources 2 Kiriakos of Ganzak 2.41; *Synax. arm.* PO 21.767-9

literature Gasparyan (1987); Nikonov (1989, 1991)

catalogues Abich (1882); Kostaneanc' (1902); Step'anyan (1964); Kondorskaja and Shebalin (1977);

Ambraseys and Melville (1982); Karapetian (1991)

This earthquake, involving at least ten thousand victims and the destruction of a whole valley, is certainly one of the most striking events recorded in Armenia and the surrounding area at this time.

Moses Dasxuranci records: "and an impenetrable darkness descended over the borders of Mozu, and the earth shook for forty days, and nearly 10,000 souls were swallowed up; and because of this [the place] was called Vayots'-jor".

Եւ ի վերուստ խաւար անտեսանելի կալաւ զՄոզանի սահման. եւ զաւուրս քառասուն շարժեցաւ վայրն, եւ խորատոյժ եղեալ ընկղմեցան կենդանւոյն ոգիք իբրեւ տասն հազար. վասն այնորիկ վայոց ձոր անուանեցաւ:

Orbelian records: "Suddenly the punishment of God above was felt. There was thick darkness over the whole region for forty days; and a powerful and destructive earthquake occurred. There was such a terrible upheaval of the earth that damage extended from deep in abysses to great heights. The earth heaved like the waves of the sea; mountains collapsed, rocks completely crumbled, while houses and fine palaces became a tomb for their inhabitants. Springs dried up and rivers disappeared. Everywhere shook, and sounds like human voices rose up from the depths into the open air: 'Vay dzor, Vay dzor' [woe, valley, woe, valley]. Of those who were registered as taxpayers, we know that about 10,000 were swallowed up alive, but no-one knows how many others lost their lives. That is why the place was called Vayoy-dzor".

Ապա յանկարծակի եհաս ի վերուստ պատուհաս Տեառն. եւ կալեալ խաւար շօշափելի զկաւառն ամենայն զաւուրս 40, եւ շարժումն եւ դրդումն սաստիկ. զի եռայր երկիրն ահեղ դողացմամբ յանդնդոց եւ բարձրանայր մինչեւ ի վեր. եւ անդէն իբր զալիս չովու փլուզանիւր. լերինք տապալէին, վեմք ի հիմանց քակտէին, տունք եւ ապարանք գեղեցիկք լինէին գերեզմանք բնակչաց. աղբիւրք խցէին. գետ կորնչէին. եւ ամենայն տեղի երերէր տատանմամբ. եւ ձայնք մարդկեղեն բարբառոյ յանդնդոց եւ ի վերուստ յօդոց "վայ ձոր, վայ ձոր". եւ կենդանւոյն ընկղմեցան ոգիք 10,000, զորս գիտէին եւ ի թիւ արկին. եւ զանճանօթիցն ոչ ոք գիտէր զհամարն. յաղագս որոյ կոչեցաւ անուն կաւառին վայոց ձոր.

This place called Vayoy-dzor or Vayoc' Jor ("The Valley of Woe" or "The Valley of Woes") is also mentioned in connection with the earthquake of 906 (see entry (279)). According to Nikonov (1989), analyses of geomorphological evidence and aerial photographs have identified traces of this earthquake on the ground (see Gasparyan 1987).

**<247> the early afternoon of 26 October 740 •Constantinople,
•Nicaea, •Nicomedia, •Praenetus, •Thrace
▷seismic sea-wave◁**

- sources 1 Theoph. 412; Georg. Mon. 2.744; Niceph. 59; *Typicon of the Great Church* 1.78
sources 2 *Chron. Brev.*, I, Reichschroniken 1.15.44, 2.2.47; Leo Gramm. 180.6-10;
The Great Chronogr. 14; Cedren. 1.801; Zon. 2.105-6
literature Whitby and Whitby (1989)
catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Heck (1947);
Downey (1955); Grumel (1958); Ambraseys (1962 b); Shebalin *et al.* (1974);
Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

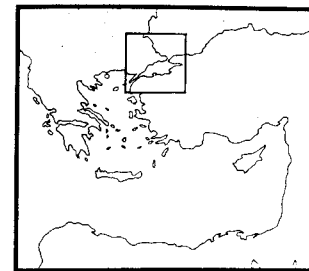
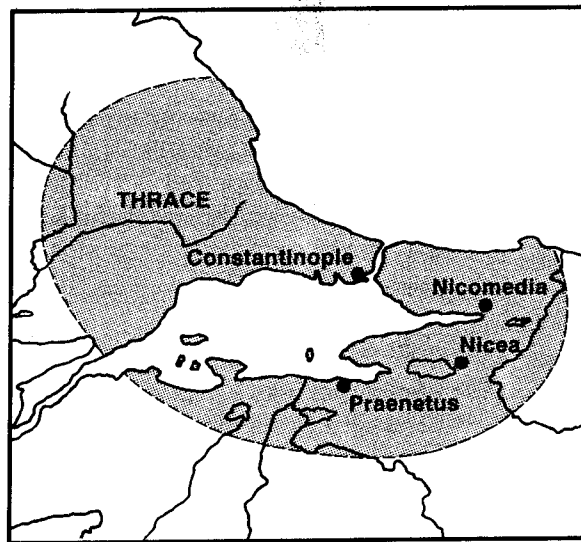
Theophanes records a period of seismic activity lasting for almost a whole year — or two years according to Georgius Monachus. Theophanes gives the date as the year of the world 6232, the twenty-fourth of the reign of Leo III [740 A.D.]. There was serious damage at Constantinople, in the villages of Thrace and in Bithynia. The fact that seismic activity lasted for so long forced many inhabitants of Constantinople to go and live in the country: "In that same year [740], there was a violent and terrible earthquake at Constantinople. It happened on 26 October, in the ninth indiction, on the fourth day of the week [Wednesday] at the eighth hour. Churches and monasteries collapsed and many people were killed. Even the statue of Constantine the Great at the Gate of Attalus collapsed, together with that of Attalus himself, and there also collapsed the stela of Arcadius on a column in the Forum on the *Xerolophus*, the statue of Theodosius the Great at the Golden Gate, the landward walls of Constantinople, towns and villages in Thrace, the city of Nicomedia in Bithynia, the city of Praenetus and the city of Nicaea, where only one church survived. In certain places the sea receded from its shores. The earthquake lasted for twelve months".

Καὶ τῷ αὐτῷ ἔτει σεισμὸς γέγονε μέγας καὶ φοβερὸς ἐν Κωνσταντινουπόλει μηνὶ ὀκτωβρίῳ κς', ἰνδικτιῶνος θ', ἡμέρα δ', ὥρα η', καὶ ἐπτώθησαν ἐκκλησίαι καὶ μοναστήρια, λαὸς τε πολὺς τέθνηκεν. ἔπεσε δὲ καὶ ὁ ἀνδριὰς ὁ ἐστὼς ἐπὶ τῆς Ἀτάλου πόρτης τοῦ μεγάλου Κωνσταντίνου ἅμα τῷ αὐτῷ Ἀτάλῳ, καὶ ἡ στήλη Ἀρκαδίου, ἡ ἐπὶ τοῦ Ξηρολόφου κίονος ἐστῶσα, καὶ ὁ ἀνδριὰς τοῦ μεγάλου Θεοδοσίου, ὁ ἐπὶ τῆς Χρυσῆς πόρτης, τὰ τε χερσαῖα τῆς πόλεως τεῖχη καὶ πόλεις καὶ χωρία ἐν τῇ Θράκῃ, καὶ ἡ Νικομήδεια ἐν Βιθυνίᾳ καὶ ἡ Πραίνετος καὶ ἡ Νίκαια, ἐν ἧ μίᾳ ἐσώθη ἐκκλησία. ἀπέφυγε δὲ καὶ ἡ θάλασσα τῶν ἰδίων ὄρων ἐν τισὶ τόποις, καὶ ἐκράτησεν ὁ σεισμὸς μῆνας ιβ'.

Georgius Monachus records: "At this time there was a powerful and terrifying earthquake, which caused the collapse of many churches, houses and the landward walls of Constantinople, as well as many castles and villages in Thrace. A great many people were involved, and the earth shook for two years, to such an extent that the sea receded from the shore".

Ἐφ' ὧν χρόνων σεισμὸς ἐγένετο μέγας καὶ φοβερώτατος, καὶ ἐπτώθησαν ἐκκλησίαι πολλαὶ καὶ οἶκοι τὰ τε χερσαῖα τῆς πόλεως τεῖχη καὶ φρούρια πολλὰ καὶ χωρία τῆς Θράκης. καὶ τέθνηκε λαὸς ἀναρίθμητος, καὶ ἡ γῆ ἐσειέτο ἐπὶ χρόνους δύο, ὥστε καὶ τὴν θάλασσαν τῶν ἰδίων ὄρων ἐν τισὶ τόποις ὑποχωρῆσαι.

The patriarch Nicephorus takes up this description of the earthquake, adding a few new details about the resulting damage: "In the meantime, an earthquake caused severe damage in Byzantium as well as in other towns and territories. It caused the immediate collapse of many houses, churches and porticoes — some of them being destroyed to their foundations — and damaged what is considered to be the most splendid of its temples: that dedicated to St. Irene, which is situated close to the Great Church [St. Sophia]. The statue of Arcadius, who ruled over the Romans for many



26 October
740



years, also collapsed. It stood on the hill called *Xerolophus* on a sculpted column. The earthquake tremors lasted throughout the year, with the result that many people abandoned the city and went to live in huts outside the walls”.

Χρόνου δὲ μεταξὺ παρελθόντος σεισμὸς ἐνσκήπτει κατὰ τὸ Βυζάντιον, μεθ’ οὗ καὶ πόλεσιν ἐτέραις καὶ χώραις ἰσχυρῶς ἐπιφύεται. καὶ ἤδη ἄλλους τε πολλοὺς οἴκους καὶ ἱεροὺς ναοὺς καὶ στοὰς ἀθρόον ἐπικαταβάλλει, ἐκ πρώτων βάθρων αὐτῶν ἔστιν οὗς τούτων ἀνατρέψας, καὶ τὸν θεῖον νεῶν ὄν τῆς ἁγίας Εἰρήνης ἐπώνυμον καλοῦσι κατέσεισεν, ὅς πλησιαιτάτα τῆς μεγάλης ἐκκλησίας ἵδρυται. μεθ’ ὃν καὶ ὁ Ἀρκαδίου τοῦ πάλαι Ῥωμαίων τὰ σκῆπτρα ἰθύνοντος ἀνδριάς, ὅς κατὰ τὸν λεγόμενον λόφον Ξηρόλοφον καθύπερθε τοῦ γλυφαίου ἵδρυται κίονος, κατὰ γῆς ἄνωθεν ἔρριπτο. διέμεινε δὲ τὰ τοῦ σάλου ἄχρι καὶ εἰς ἐνιαυτὸν ὅλον· διὸ πλείονοι τῆς πόλεως προϊόντες καὶ ἔξω τειχῶν ἀνυλίζόμενοι ἐν καλύβαις κατέμενον.

The *Typicon of the Great Church* also records this earthquake: “The same day [26 October] is the anniversary of that great threat to the human race, the earthquake of the year of the world 6249, during the fifth cycle of the sun and the sixteenth of the moon, in the ninth indiction, during the reign of Leo the Isaurian”.

μνήμη τῆς μετὰ φιλανθρωπίας ἐπενεχθείσης φοβεράς ἀπειλῆς τοῦ σεισμοῦ ἐν τῷ, σμθ’ ἔτει τοῦ κόσμου, ἐν ᾧ κύκλος ἦν ἡλίου ε’, σελήνης ις’, ἰνδικτιων θ’, ἐπὶ Λέοντος τοῦ Ἰσαύρου.

The earthquake definitely occurred in the year 740, so what we have here must be a scribal error. Downey (1955, p.598), uses the *Synaxarium Ecclesiae Constantinopolitanae* 166.31-7 to date the earthquake to 26 October.

< 248 > 743/744 the Gates of the Caspian [Derbend or Tališ] ▷ volcanic eruption ◁

sources 1 Theoph. 418

sources 2 Cedren. 805-6

literature Simonyan (1989)

catalogues von Hoff (1840); Mallet (1853); Grumel (1958); Ambraseys and Melville (1982); Guidoboni (1989)

The name “Gates of the Caspian” was used to indicate in an imprecise way various mountain passes in the Caucasus which linked the Mediterranean area to the Iranian plateau and central Asia. Theophanes records an earthquake in this region in the year of the world 6235, during the third year of the reign of Constantine V [743/744 AD]: “In this year a sign appeared in the north, and ashes rained on various places. There was also an earthquake at the Caspian Gates”.

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catalogue 740–744 A.D.

Τούτω τῷ ἔτει κατὰ βορρᾶν ἐφάνη σημεῖον, καὶ κόνις κατήλθεν εἰς τόπους. γέγονε δὲ καὶ σεισμός εἰς τὰς Καστίας πύλας.

Cedrenus takes up the information provided by Theophanes, repeating his words. Ambraseys and Melville (1982, pp.37 and 172) think this earthquake occurred in Iran, to the east of the ancient capital city of Ray, in the valley of Tang-e Sar-e Darreh, and they account for the fact that it is recorded in Byzantine sources by supposing it to have been "a large magnitude event". But in fact, the name "Gates of the Caspian" was used in an imprecise way to indicate various mountain passes in the Caucasus, linking the Mediterranean area to the Iranian plateau and central Asia. The expression was well known to Greek and Roman writers, and later on was generally used to indicate the pass of Derbend, the city of that name being also known, even during the period of Islamic rule, as "the Gate" and also "the Gate of Gates", because it was the most important pass linking the Caucasus and northern Iran. The Armenian translation of Pseudo-Callisthenes (5th century, reworked in the 13th century), for example, is a text which locates the Caspian Gates in the territory of Tališ (Simonyan 1989, p.233). Von Hoff (1840) and Mallet (1853) thought, perhaps mistakenly, that they were the pass of Darial near the Black Sea. Ambraseys and Melville (1982), on the other hand, rely on Iranist studies for their identification of the earthquake; but we think their view is mistaken and runs counter to the evidence provided by many other sources. In particular, it is difficult to understand why Byzantine sources should bother to take an interest in an Iranian area.

- 〈249〉 **the morning of 18 January 749** ●Ba'albek, ●Beit Qubayeh, ●Bosrah, Damascus, ●Dar'at, ●Dārāyā, ●al-Ghoutha, ●Jericho, ●Jerusalem, ●Mabbug, ●Nawa, ●Tiberias, ●Mt.Tabor, ●Palestine, ●Mesopotamia, ●Syria
 ▷landslides, surface faulting, seismic sea-wave ◁
- sources 1 Theoph. 422, 426; [Dion. Tellmahr.] 2.191-2; Elias Nisib. *Syr.versio* 171-2; Mich. Syr. 466-7; al-Dhahabī, *Ta'rikh al-Islām* 5.39; Ibn Tagrī Birdī, *al-Nujūm al-zāhira* 1.311
- sources 2 Georg. Mon. 2.760; Niceph. 64-5; Cedren. 807, 809; Zon. 2.108
- literature Margalio (1960); Russell (1985); Tsafir and Foerster (1992)
- catalogues Manetti [1457]; Ligorio [1574-7]; Bonito (1691); von Hoff (1840); Mallet (1853); Willis (1928); Sieberg (1932 a); Amiran (1950-51); Grumel (1958); Ambraseys (1962 b); Ben-Menahem (1979); Guidoboni (1989)

In the mid-8th century, a powerful earthquake struck Palestine, inflicting serious damage at Jerusalem and Tiberias, and causing a landslide at a village near Mt.Tabor. The earthquake is recorded in a substantial group of Byzantine, Syriac and Arab sources. The date of the earthquake, however, has remained a much debated problem to this day. Because they use different dating styles, the sources themselves are in apparent disagreement over the matter, to the extent that one is tempted to suppose that there was a whole series of tremors rather than a single earthquake. Even the modern scholars who have tackled the problem from time to time are not in agreement. For example, the earliest compilers of Palestinian earthquake catalogues dated this earthquake to 746 A.D. (Willis 1928, p.80; Amiran 1951-2, p.226), whereas Russell (1985, pp.47-9) suggested 748, and Margalio (1960) 749.

During recent excavations at Beth-shan, Tsafir and Foerster (1992) have discovered new archaeological and numismatic evidence concerning this earthquake, and their thorough examination of the very complex chronological problems involved has led them to the conclusion that it occurred on 18 January 749 A.D., thereby adding weight to the hypothesis put forward by Margalio (1960).

The above considerations make it seem likely that another passage in Theophanes may actually refer to the 749 A.D. earthquake, even though it is given a slightly different date. Theophanes describes an earthquake in Mesopotamia and Syria in the year of the world 6242 [749-750 A.D.], the year in which Leo IV was born, in the third indiction. He records the various levels of destruction caused in many cities, unfortunately without giving their names, as well as large-scale surface faulting: "In the same year, there was an earthquake in Syria which caused widespread and terrible destruction. Some cities were completely destroyed, others were only partly destroyed, and yet others moved 6 miles [c.10 km] or more from the mountains towards the plains below, remaining completely intact, with their houses and walls. Those who witnessed the earthquake say that the ground in Mesopotamia split open over a distance of 2 miles [c.3 km] and that there came out of the fissure a different kind of white and sandy earth, from which appeared, so they say, an animal like a mule, quite spotless. And speaking with a human voice, it predicted that a people from the desert would attack the Arabs; and that did indeed subsequently happen".

Georgius Monachus provides the same information.

sources 1	Theoph. 430; [Dion. Tellmahr.] 2.216
sources 2	The Great Chronogr. 12
literature	Payne Smith (1879); Russell (1985); Whitby and Whitby (1989)
catalogues	von Hoff (1840); Mallet (1853); Sieberg (1932 a); Amiran (1950-51); Grumel (1958); Guidoboni (1989)

Τούτω τῷ ἔτει σεισμός γέγονε κατὰ τὴν Παλαιστίνην καὶ Συρίαν οὐ μικρὸς μενί
μαρτίῳ θ'.

[illegible]

the time of king Constantine, and which the clement God suddenly caused to burst forth at that time”.

καὶ μνήμη τῆς μετὰ φιλανθρωπίας ἐπενεχθείσης ἡμῖν φοβεράς ἀπειλῆς τοῦ σεισμοῦ κατὰ τοὺς χρόνους Κωνσταντίνου τοῦ βασιλέως, ἥς παρ’ ἐλπίδα ὁ φιλάνθρωπος Θεὸς τοὺς τότε ἐρρύσατο.

According to Downey (1955, p.599), this is not the earthquake of 790 nor that of 796. In any case, there must be considerable doubt as to whether it really occurred.

〈253〉 **9 February 790 Constantinople**

sources 1 Theoph. 464

sources 2 Cedren. 823

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Downey (1955); Grumel (1958); Guidoboni (1989)

Theophanes records an earthquake at Constantinople in the year of the world 6282 [790 A.D.]. It may have done no more than cause a great deal of alarm, as there is no mention of collapses: “On 9 February, in the thirteenth indiction [790], there was such a violent earthquake that some people were too frightened to sleep indoors, and so they spent the night in gardens or in tents set up in the open. Even the empress and her son took refuge in the palace of St.Mamas”.

Τῇ δὲ θ’ τοῦ φεβρουαρίου μηνὸς τῆς ιγ’ ἰνδικτιῶνος σεισμὸς γέγονε φοβερώτατος, ὥστε μὴ τολμᾶν τινες ἐν οἴκῳ καθευδῆσαι, ἀλλὰ πάντας εἰς τοὺς κήπους καὶ τὰ ἐξάερα σκηναὶς ποιήσαντας διάγειν. ἡ δὲ βασίλισσα ἅμα τῷ υἱῷ αὐτῆς ἐξῆλθεν ἐν τῷ ἀγίῳ Μάμαντι.

〈254〉 **16 March 796–4 March 797 •Alexandria, Egypt**

sources al-Ṭabarī, *Ta’rikh* 3.2.645

literature Taher (1979)

catalogues von Hoff (1840); Mallet (1853); Ben-Menahem (1979); Poirier and Taher (1980); Maamoun *et al.* (1984); Guidoboni (1989)

The Arab historian al-Ṭabarī refers to a strong earthquake in Egypt which damaged the lighthouse at Alexandria: “In that year [180 of the Hegira = 16 March 796 – 4 March 797 A.D.] a strong earthquake occurred in Egypt, and the top of the lighthouse at Alexandria collapsed”.

وفيهما كانت بأرض مصر زلزلة شديدة فسقط رأس منارة الاسكندرية.

This may be the earthquake which, according to Theophanes, struck Crete in April 796 (see entry 〈255〉); but since al-Ṭabarī provides only a rough date, giving no more than the year of the Hegira, we cannot be sure about this. We have therefore preferred to keep the two events separate.

〈255〉 **a night in April 796 Crete**

sources 1 Theoph. 470

sources 2 *Chron. Brev.* I, Reichschroniken, 2.15.49

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Sieberg (1932 a); Grumel (1958); Galanopoulos (1961); Shebalin *et al.* (1974); Ben-Menahem (1979); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

Theophanes records an earthquake in Crete in the year of the world 6288 [795-796 A.D.]: "This year, in the month of September, in the fourth indiction, the emperor celebrated his marriage to Theodote in the palace of St.Mamas for forty days. Then one Saturday night in the month of April in the same fourth indiction, there was a very violent earthquake in the island of Crete".

Τούτω τῷ ἔτει, μηνὶ σεπτεμβρίῳ, ἰνδικτιῶνος δ', ἐποίησε τὸν γάμον ὁ βασιλεὺς μετὰ Θεοδότῃς ἐν τῷ παλατίῳ τοῦ ἁγίου Μάμαντος ἡμέρας μ'. τῷ δὲ ἀπριλλίῳ μηνὶ τῆς αὐτῆς δ' ἰνδικτιῶνος, ἡμέρα ζ', ὥρα νυκτερινῇ, γέγονε σεισμὸς ἐν τῇ νήσῳ Κρήτῃ φοβερώτατος.

The five saturdays in April 796 fell on the 2nd, 9th, 16th, 23rd and 30th of the month. This may be the earthquake which, according to al-Tabari, struck Egypt in the year 180 of the Hegira [16 March 796 – 4 March 797 A.D.]; but see also the considerations set out in entry (254).

(256) 4 May 796 Constantinople

sources Theoph. 470

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Downey (1955); Grumel (1958); Guidoboni (1989)

Immediately after describing the earthquake in Crete (see entry (255)), Theophanes goes on to say that another struck Constantinople shortly afterwards: "A very violent one [earthquake] also occurred at Constantinople on 4 May".

Ἐγένετο δὲ καὶ ἐν Κωνσταντινουπόλει μηνὶ μαίῳ δ' πάνυ φοβερός.

(257) 29 April 801 c.8 p.m. ●Rome, Spoletium ▷landslides◁

sources 1 Einhardi Ann. 114; Lib. Pont. 2.9-10

sources 2 Ann. Blandin. 23; Ann. Iuvav. 736; Ann. Fuld. 352; Ann. Til. 223; Ann. Mett. 32; Ann. Ratisp. 582; Ann. Regni Franc. 114; Annalista Saxo 564; Bernold. Chron. 419; Petrus Bibl. Hist. Franc. 417; Herimann. Augiens. Chron. 101; Ptol. Lucens. Hist. Eccl. 989; Regino Prum. Chron. 563

literature de Rossi G.B. (1874); de Rossi M.S. (1874); Lanciani (1918); Valentini and Zucchetti (1942); Guerrieri (1951); Krautheimer *et al.* (1971); Ferrari and Marmo (1985); Molin and Guidoboni (1989); Marmo (1989 b); Budriesi (1989)

catalogues Bonito (1691); Abbati (1703); von Hoff (1840); Perrey (1848); Mallet (1853); Capocci (1861); Mercalli (1883); Baratta (1892, 1899, 1901); Galli (1906); Grumel (1958); Carrozzo *et al.* (1973); Guidoboni (1989); Alexandre (1990)

The *Annales* traditionally attributed to Einhard were probably written not long after the events they record. Having first referred in general terms to the reorganisation of public, private and ecclesiastical administration in Rome and throughout Italy carried out by Charlemagne during the winter after his coronation, they then go on to record that on 25 April 801, the emperor left Rome for Spoletium (now Spoleto). The text then reads: "[The emperor] arrived in Spoletium. While he was there, on the day before the Calends of May [30 April] at the second hour of the night, a very severe earthquake occurred, which violently shook the whole of Italy. As a result, a large part of the roof of the church of San Paolo Apostolo collapsed with its beams, and in some places towns and mountains collapsed".

[Imperator] Spoletium venit.

Ibi dum esset, ii. Kal. Mai. hora noctis secunda terrae motus maximus factus est, quo.

tota Italia graviter concussa est. Quo motu tectum basilicae beati Pauli apostoli magna ex parte cum suis trabibus decidit et in quibusdam locis urbes montes ruerunt.

The life of Pope Leo III (795-816) in the *Liber pontificalis* concentrates on the contributions of the Pope to the restoration of San Paolo in the Via Ostiense, thereby throwing further light on the extent of the earthquake damage: "In the ninth indiction, because of the weight of our sins, an earthquake suddenly occurred on the day before the Calends of May [30 April], and the church of San Paolo Apostolo was shaken by an earthquake, and its roofs entirely collapsed. When the great and illustrious Pope saw this, he was much troubled, and began to lament over the silverware and other items which were broken and destroyed inside. But with the approval and protection of the Lord, the Pope made a concerted effort to restore the church to its former state, and he devoted much energy to restoring and improving its appearance with marble decoration; for he decorated both the presbytery and the rest of the church with marble, and renewed its porticoes. And at the same time he restored all its roofs and offered three gold images, namely of our Saviour Jesus Christ and of the Apostles Peter and Paul, and he placed another image of the Saviour, made of silver and decorated with gold, over the entrance doors, at a cost of sixty *librae*. And he made the church windows extremely beautiful with metal and plaster decoration".

Nona vero indictione, peccatis nostris imminetibus, subito terre motus factus pridie kl. mai., ecclesia beati Pauli apostoli ab ipso terre motu concussa, omnia sarta tecta ruerunt. Qui conspiciens magnus et praeclarus pontifex in magna evenit tribulatione; lamentare caepit tam pro argento quamque pro ceteris speciebus quibus ibidem demolitae et confractae sunt. Sed Domino annuente et beatorum apostolorum principem protegente prelatus pontifex ex totis nisibus suis certamen ponens, instar sicut ex antiquitus existerat, ampla et maxima fortitudine ponens, in meliorem deduxit statum et in meliorem speciem ea marmoribus decoravit, tam presbiterio quamque tota aeclesia marmoravit et eius portica renovavit. Simulque et in navem quae est super altare sarta tecta omnia noviter restauravit, quatinus et tres imagines aureas ibidem offeruit, scilicet Salvatoris domini nostri Iesu Christi, beatorum principum apostolorum Petri et Pauli, seu aliam imaginem argenteam Salvatoris deauratam super postes in introitu posuit, pens. lib. LX, sed et omne argentum ibidem quod conquassatum inerat noviter restauravit. Necnon et fenestras ipsius aeclesiae mire pulcritudinis ex metallo gypsi-no decoravit.

It is clear from the above that it was not just the church roof which was damaged, for the external porticoes were apparently also repaired, and perhaps the floor (Lanciani 1918, p.18). It may also be important to remember that during the reign of Pope Gregory III (731-741), many of the beams in San Paolo had been renewed, as had the roof, from the altar to the main doors (*Lib. Pont.* i, p.420): "he renewed five beams in the church of San Paolo, and repaired and restored the whole roof of the church from the altar arch to the main doors".

In ecclesia beati Pauli mutavit trabes num. v atque totum eiusdem basilicae tectum ab arco altaris et usque ad regias recursit ac restauravit.

Further work on the church had been carried out by Hadrian I (772-795) and Pope Leo III himself before the earthquake, but this had been almost entirely for decorative purposes (*Lib. Pont.* i, p.499, ii, p.2). When the earthquake occurred, therefore, the building must have been in a good state of preservation.

The church of Santa Petronilla in the Via Ardeatina (well known as the church where St.Nereus and St.Achilleus were buried) may have collapsed as a result of this earthquake. Judging from a study made by the seismologist M.S. de Rossi (1874), it seems that the church collapsed all at once. The columns, moreover, were found lying almost

parallel, as one can see from the excavation photographs (in Krautheimer *et al.* 1971, p.130). At the time of the earthquake, the church of Santa Petronilla must already have been abandoned for some time. Under Pope Paul I (757-767), in fact, the remains of St. Petronilla had been removed from the church to the Vatican and, since the *Liber pontificalis* has nothing to say on the matter, one can only surmise that perhaps the remains of St. Nereus and St. Achilleus were also transferred, before the end of the 8th century, from the cemetery church to the church in the city dedicated to them, which stood near the Antonine Baths (see Guerrieri 1951, pp.43-4).

This theory is supported by the fact that when the cemetery church collapsed, it had already been officially closed; for the excavations show that "the main door of the church was found closed, there were no liturgical furnishings inside, nor were there any seats round the apse, and there was no altar, no throne and no ambons; and the doorway at the end of the north wall had been filled in with masonry" (Guerrieri 1951, p.44; and he refers to G.B. de Rossi 1874, p.18). Further confirmation of this theory lies in the fact that none of the sources (most importantly the *Liber pontificalis*) has anything to say about the church itself. The latest references to the church are in fact to be found in the *Itinerarium Einsidlense* and in the collection of inscriptions contained in a single codex in the monastery at Einsiedeln and dating to the end of the 8th century (Valentini and Zucchetti 1942, II, pp.156 and 162; the church is mentioned on pp.172 and 200).

The two sources which record the earthquake are independent of each other and, thanks to the fact that they use different dating systems, confirm each other: for the year 801 coincides with the ninth indiction mentioned in the *Liber pontificalis*. While both give the date as 30 April, we have to take into account another factor, if we want to narrow down the time when the earthquake started. Einhard claims that it started at the second hour of the night of 30 April, and in doing so he is clearly adopting the Roman system of counting the hours (Ferrari and Marmo 1985, pp.692-6). This corresponds to about 8 p.m. on the previous day, local time. For in the Roman convention, the first hour of the night began at sunset, and so what were for the Romans the first hours of the night of 30 April are for us the last hours of 29 April.

Einhard's words "in some places towns and mountains collapsed" suggests that the greatest damage occurred in places other than Rome and Spoleto, but we cannot narrow this down, for lack of information about other parts of central Italy. Einhard goes on to record another earthquake, on the Rhine, which damaged places in both Germany and France. This latter earthquake obviously has nothing to do with the one at Rome and Spoleto. The fact that only Rome and Spoleto are mentioned in the sources is largely due to their being the seat of the chief political and ecclesiastical authorities. This is another earthquake which acquired a considerable reputation in the medieval historiographical tradition, as is clear from the numerous works which mention it down the centuries.

The 16th century Italian historiographical tradition records an earthquake in 896, the information being based on a collapse reported in the *Liber pontificalis* (II, p.229) in the church of San Giovanni, during the papacy of Stephen VI (896-897). In actual fact, the collapse was the result of progressive deterioration in the fabric of the building, as the source clearly indicates (see Molin and Guidoboni 1989, pp.194-202 for a technical consideration confined to the city of Rome, and Marmo 1989 b, pp.302-4 for the earthquake as treated in the sources).

<258> 813-820 location unknown [Byzantine area]

sources 1 Georg. Mon. 2.778

sources 2 Genes. 28

catalogues Guidoboni (1989)

Georgius Monachus records various disasters in general terms, including some alarming earthquakes: “There were indeed frightening and repeated earthquakes, famine, drought and heat waves, and internal rebellions began from the time of that enemy and persecutor of God [Leo V the Armenian], until, a long time afterwards, there occurred an epidemic which was even worse than the evil of internal misfortunes”.

Καὶ μέντοι καὶ σεισμοὶ φοβεροὶ τε καὶ ἐπάλληλοι καὶ λιμοὶ καὶ αὐχμοὶ καὶ ἀέρος φλογώσεις γεγόνασιν, καὶ στάσεις ἐμφύλοι κατὰ πᾶσαν χώραν καὶ πόλιν ἐκ τῶν ἡμερῶν ἀρξάμενοι τοῦ θεοστυγοῦς καὶ ἀλάστορος, μέχρι πολλοῦ τὸ δεινὸν τῆς ἐμφυλίου συμφορᾶς ἐπικρατῆσαι συμβέβηκε νόσημα.

Genesius repeats verbatim information taken from Georgius Monachus.

〈259〉 824 ●Panion

sources 1 Theoph. Cont. 71; Genes. 45

sources 2 Scylitz. 41; Cedren. 890; Zon. 139

catalogues Bonito (1691); Grumel (1958); Papazachos and Papazachos (1989); Guidoboni (1989)

This earthquake is recorded in Theophanes Continuatus in connection with the capture by military forces of the city of Panion in Thrace: “But when he [Michael] approached them [the cities of Panion and Heraclea], he had no difficulty in entering Panion, because an earthquake had knocked down the city walls”.

Πλὴν ταύταις πλησιάσας, τοῦ μὲν σεισμοῦ ἐπιγινομένου καὶ τοὺς τείχους τοῦ Πανίου καταβληθέντος ἢ εἰς αὐτὸ πάροδος ἀκμητὶ γέγονε τῷ Μιχαήλ.

Genesius reports: “Since some of the tyrant’s [Thomas the Slav’s] followers had seized the city of Panion and, although Thomas was now dead, had decided to fight the emperor, when the emperor Michael reached the vicinity, he proposed a peaceful solution, but he was quite unsuccessful in persuading them to lay down their arms. Then, by the will of God, a prodigy appeared to them: a violent earthquake knocked down the walls and allowed the emperor’s followers to enter the city”.

Ἐπεὶ δέ τινες τῶν τοῦ τυράννου τὴν καλουμένην Πάνιον κατασχόντες πόλιν, ἄρτι μὲν τούτου ἀπεφθορότος, εἰς τὸ πολεμεῖν βασιλεῖ διέγνωσαν καταστήναι, πρὸς ἣν ἐλθὼν ὁ βασιλεὺς Μιχαήλ καὶ λόγους εἰρηνικοὺς προτεινόμενος οὐδαμῶς πείθει κατασθῆσθαι τὰ ὅπλα, γίνεται δὴ τι θεόθεν σημεῖον αὐτοῖς· σεισμός γάρ σφοδρὸς τό τε τεῖχος κατέβαλεν καὶ τοῖς τοῦ βασιλέως τὴν εἰς πόλιν δέδωκεν ἀρόδον.

We have deduced the date of the earthquake from that of the death of Thomas the Slav. Grumel (1958, p.479) dates it to Ascension Day [5 May] 824.

〈260〉 829–842 location unknown [Byzantine area]

sources 1 Georg. Mon. 2.798

sources 2 Genes. 74-5

catalogues Guidoboni (1989)

Georgius Monachus records in general and rhetorical terms atmospheric disturbances, social disasters and earthquakes during the reign of the emperor Theophilus: “There was very intense and bitter cold and a long famine with drought, bad weather and unusual conditions, as well as frightening and repeated earthquakes, all of which indicated the immense perversity and wickedness of the emperor [Theophilus]”.

Καὶ ψῦχος δὲ πολὺ γέγονεν ἀγριώτατον καὶ δριμύτατον, καὶ λιμὸς ἰσχυρὸς καὶ αἶρος αὐχμοὶ καὶ δυσκρασίαι καὶ ἀνωμαλίας καὶ σεισμοὶ φοβεροὶ καὶ ἐπάλληλοι, τὴν ἄμετρον ἀπελέγχουσαι τοῦ κρατοῦντος μοχθηρίαν καὶ κακουργίαν.

Genesius repeats these words.

〈261〉 **5 January – 25 December 835 •Antioch**

sources al-Suyūṭī, *Kashf* 25
literature Taher (1979)
catalogues Poirier and Taher (1980)

The Arab polygraph al-Suyūṭī reports briefly that: “The earth shook for forty days at Antioch, and the city was destroyed”.

زلزلت الأرض ودامت أربعين يوما وتهدمت أنطاكية.

The fact that al-Suyūṭī maintains that the earthquake lasted for forty days reminds us of the descriptions of the earthquake of 713, and suggests a possible doublet.

〈262〉 **the night of 30 December 836 Pavia**

sources *Ann. Fuld. pars* 1 27-8
literature Ho Peng Yoke (1962); Maffei (1987)
catalogues Bonito (1691); Perrey (1848); Mallet (1853); Mercalli (1883); Guidoboni (1989); Alexandre (1990)

The first part of the *Annales Fuldenses*, which ends at the year 838, reports an earthquake at Pavia: “837. It is reported that Pavia in Italy shook eight times during the night on the third day before the Calends of January [30 December 836]. Many very eminent men of Italy were killed, the most outstanding being Lambert and Hugo. On the third day before the Ides of April [11 April], a comet appeared in the sign of Libra and was visible for three nights”.

DCCCXXXVII. Ticinum in Italia III. Kal. Ian. noctu octies tremuisse perhibetur. Plures ex primoribus Italiae defuncti sunt, inter quos praecipui fuerunt Lambertus et Hugus. Stella cometes in signo Librae apparuit III. Id. April. et per tres noctes visa est.

The text seems to suggest that Lambert and Hugo were killed in the earthquake. But a comparison with the *Annales Bertiniani* (MCH, SRG, vol.5) makes it clear that Count Lambert of Nantes and his father-in-law Hugo of Tours led a conspiracy against the emperor Louis I, and that their death in 838 had nothing to do with the earthquake. Consequently, the little information provided by the *Annales Fuldenses* does not permit us even to guess what the effects of the earthquake may have been.

The comet linked to the earthquake was Halley's comet. It passed by the earth in spectacular fashion on 9 April 837 at a distance of only 5,800,000 km — the nearest it has been to the earth in the last 2000 years (Maffei 1987, pp.198-203; for Chinese sources, see Ho Peng Yoke 1962, pp.173-4).

〈263〉 **10 April – 31 August 847 Rome**

sources *Lib. Pont.* 2.108
literature Tea (1937); Krautheimer *et al.* (1964); Molin and Guidoboni (1989); Budriesi (1989)
catalogues Filippo da Secinara (1652); Baratta (1892); Guidoboni (1989); Alexandre (1990)

catalogue 821-847 AD.

The *Liber pontificalis*, which is based on ancient archive documents, records that “at the time of this Pope [Leo IV] an earthquake occurred in Rome in the tenth indiction, and everyone saw that everything was shaken”.

Huius beati tempore praesulis terre motus in urbe Roma per indictionem factus est x, ita ut omnia elementa concussa viderentur ab omnibus.

Since Leo IV was crowned on 10 April 847, and the tenth indiction of his reign ended on 31 August 847, the earthquake must have occurred between these two dates.

The *Liber pontificalis* does not record any specific damage to buildings as a result of this earthquake. However, it has been suggested that it was responsible for the church of Santa Maria Antiqua being abandoned, and its privileges and possessions being transferred to Santa Francesca Romana.

After Santa Maria Antiqua had been abandoned, the south side of the Forum was filled in on a number of occasions over the centuries until, in the 19th century, the ground level was as much as 10 metres higher than that of the central nave of the old church (Krautheimer *et al.* 1964, p.252). Sporadic excavations were carried out from the 16th to the 18th century, but it was only in the early 20th century that Giacomo Boni made a serious exploration of the site (Tea 1937, pp.3-20), and thanks to a drawing made by the architect Antonio Petrucci at that time, we can have at least some idea of the state of the building when it was rediscovered (it appears to have been looted more than once; see Krautheimer *et al.* 1964, plate xx). For a recent analysis of the architectural structure of the church, see Budriesi (1989, pp.365-7).

The available evidence can be interpreted to show that these tremors were not related to the earthquake at Isernia which Leo Ostiensis dates to the year 847, but which very probably occurred the following year (see entry <265>).

<264> **24 November 847 •Antioch, •Bayt Lahyā, •Damascus, •Dārāyyā, al-Ghouta, Mawṣil, •al-Mazzah**

sources 1 al-Dhahabī, *al-Ibar* 1.413

sources 2 al-Suyūṭī, *Kashf* 25-6

literature Taher (1979)

catalogues Sieberg (1932 a); Ben-Menahem (1979); Poirier and Taher (1980)

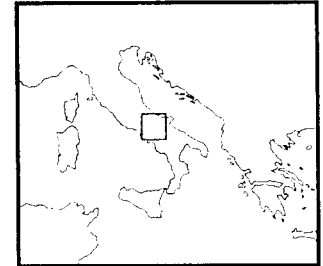
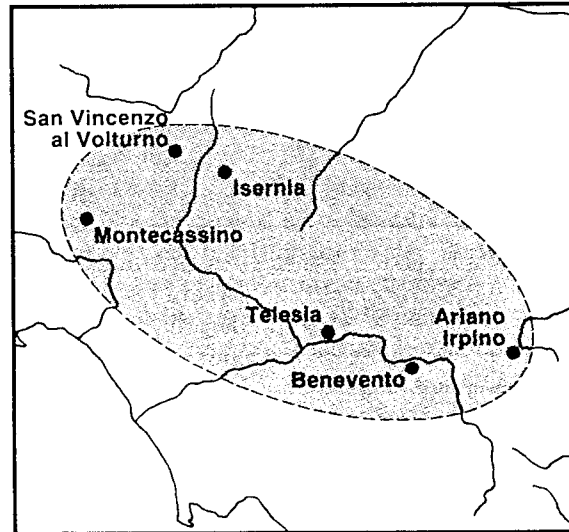
According to al-Dhahabī a violent earthquake struck Damascus and Antioch, causing serious damage and many deaths: “In that year [233 of the Hegira = 17 August 847 – 4 August 848 A.D.] there was a dreadful earthquake at Damascus. It lasted for three hours, causing the walls to collapse. People ran to the mosques to invoke God’s mercy, and many of them died in the ruins. The earthquake reached Antioch, and it was said that 20,000 people died there. Then it reached Mawṣil; it was claimed that 50,000 people died in the ruins”.

فيها كانت الزلزلة المهولة بدمشق. دامت ثلاث ساعات وسقط الجدران وهرب الخلق الى المصلى يجأرون الله ومات عدد كبير تحت الردم وامتدت الى انطاكية فيقال أنه هلك من أهلها عشرون ألفا. وامتدت الى الموصل فزعم بعضهم أنه هلك بها تحت الردم خمسون ألفا.

al-Suyūṭī repeats the information from al-Dhahabī and goes on to quote a passage from a work on earthquakes by al-Ḥāfiẓ Ibn ‘Asākir, in which this particular one is referred to. From all this we can deduce that the earthquake took place on 24 November 847 A.D.: “There was a strong earthquake mentioned by al-Ḥāfiẓ Ibn ‘Asākir, in [his] *Kitāb al-zalāzil* (Book of earthquakes): the earth shook in Damascus on Thursday morning, 11 rabi’ II of the year 233 [24 November 847 A.D.]. A quarter of the mosque [the Ommiad Great Mosque] was broken off and its great stones were pulled apart. The minaret fell down; and bridges and houses collapsed. The earthquake

reached al-Ghūta [al-Ghouta] and it destroyed Dārayyā, al-Mazzah, Bayt Lahyā and other. People went to the mosques to pray till mid-day; then the world became calm again”.

كانت زلزلة عظيمة ذكرها الحافظ ابن عساكر في كتاب الزلازل: زلزلت دمشق يوم الخميس ضحى لاهدى عشرة خلت من ربيع الآخر سنة ثلاث وثلاثين ومائتين فقطعت ربعا من الجامع وتزايدت الحجارة العظام ووقعت المنارة وسقطت القناطر والمنازل وامتدت في الغوطة فأتت على داريا والمزة وبيت لها وغيرها وخرج الناس إلى المصلى يتضرعون إلى قريب نصف النهار فسكنت الدنيا.



June
848



〈265〉 **June 848 ●Ariano Irpino?, ●Isernia, Montecassino, ●San Vincenzo al Volturno, ●Telesia, ●the Benevento area**

- sources** *Chron. S.Bened. Casin.* 473-4; Leo Ost. *Chr. Mon. Casin.* 82; *Chron. Vultur.* 306
- literature** Amari (1933); Cilento (1957, 1961); Pantosti and Valensise (1989); Hodges (1994, unpublished report on the 1990-93 excavations)
- catalogues** Filippo da Secinara (1652); Bonito (1691); Perrey (1848); Mallet (1853); Capocci (1861); Mercalli (1883); Baratta (1901); Galli (1906); Carrozzo *et al.* (1973); Guidoboni (1989)

The *Chronica Monasterii Casinensis* of Leo Ostiensis and the *Chronicon Vulturense* are both reliable sources, and both derive from the *Chronica Sancti Benedicti Casinensis*, which were written about the middle of the 9th century either by more than one author or by one author at different times (Cilento 1957, p.6, note 1). The last of these is a vitally important source for piecing together the results of the earthquake: “In the month of June [848 A.D.] there was a great earthquake throughout the region of Benevento, with the result that the city of Isernia was reduced to ruins and many people died; it even killed the bishop of the city. Buildings were equally badly damaged at San Vincenzo al Volturno, and its violence was also equally felt at the monastery of St.Benedict [Montecassino], but not a single stone fell from its place there. When this was reported to Massar, who was planning to plunder the now ruined city of Isernia, he said: ‘The God of all things is angry with them, and shall I add my wrath to his? I will not go there’. A new Telesia was built in place of the earlier one on the plain that bears its name”.

Mense Iunio generalis per totam Beneventi regionem terremotus factus est magnus, ita ut Iserniensem funditus urbem obrueret multumque perimeret populum; ad ultimum etiam et praesulem extinxit eiusdem civitatis. Pari ruina aedificiorum extitit apud

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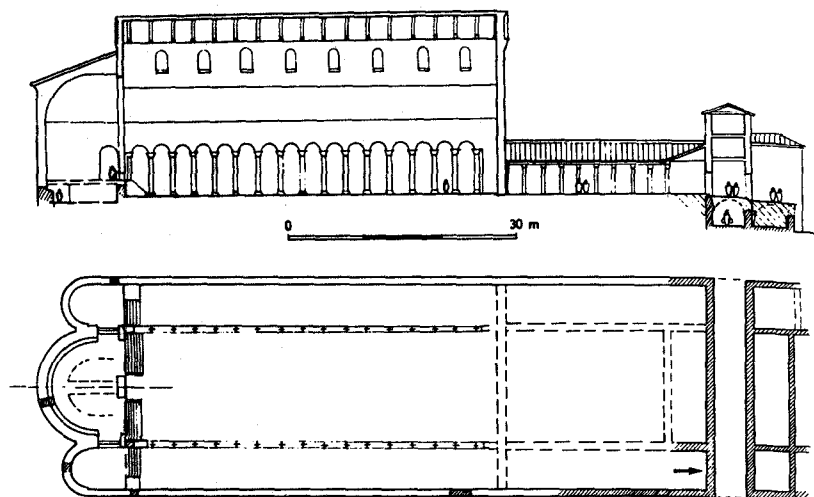
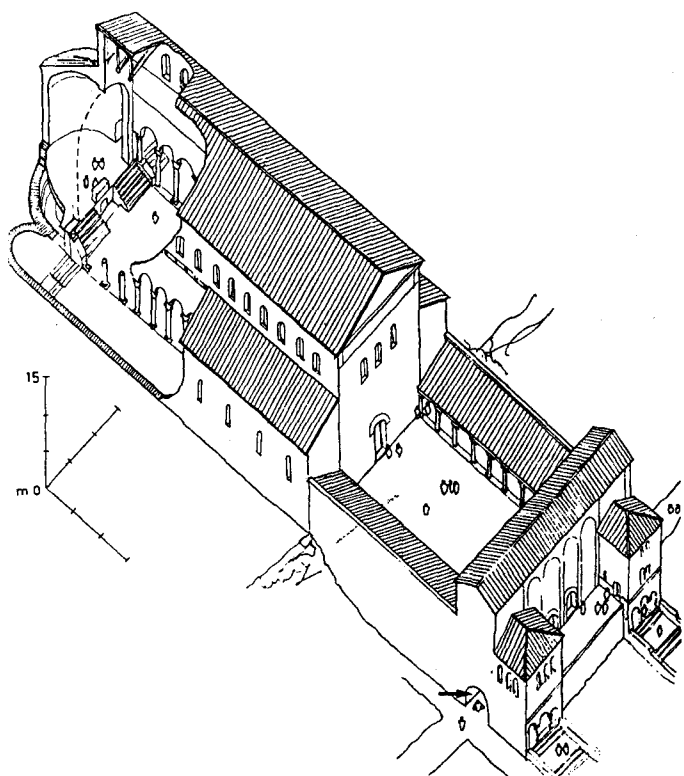


plate 1. Axonometric projection showing a reconstruction of the basilican abbey church of San Vincenzo Maggiore and attached structures (monastery of San Vincenzo al Volturno, Province of Isernia). The reconstruction is based on the results of the 1990-93 excavation campaign and a geophysical exploration carried out in May 1993. If we accept the information provided by the *Chronicon Vulturnense*, the building was completed in 808. When excavation of the façade was completed, it was possible to calculate its overall length at 28.3 metres. Since the *Chronicon Vulturnense* gives the three dimensions of the building in *passus*, the fact that we know one of the measurements in metres has made it possible to work out the overall height of the church itself as about 20 metres. However, the

Sanctum Vincentium, similique vim fuit terremoti ad Benedicti beati coenobium, sed nec unus quidem lapidis suo de loco labsum est. Quod dum Massaro nuntiatum fuisset, ut ruinosam depredaret Iserniam, ait enim: 'Dominus omnium illuc iratus est, et ego peramplius desebeam? Non utique ibo!' Telesis nova secus primariam in planitiem sui cognominis construitur.

Cilento (1961, p.96) takes this particular episode from the *Chronica* as a typical example of the historiographical approach of southern Italian monks: they have no universalistic ambitions, and offer a version of history which is essentially factual. The author of the *Chronica* is passionately involved in the affairs of his area, and in the developing relationships between those in power, and tries hard to bring a certain balance and objectivity to his portrayal of the persecutors of the monastery, without generalising the repulsion he feels towards them.

One example of this is his treatment of the Saracen leader (the *Massar* in the quotation from the *Chronica*: the name "Massar" as used by the chroniclers — it appears elsewhere as Massari, Massaro or Abomasale — is unknown to Arab sources, but it can be reconstructed as Abū Ma'shar; see the note by C.A.Nallino in Amari 1933, I, p.509, note 1) who, in spite of his depredations, as Cilento observes (1961, p.96), takes on a chivalrous role when he declares that he will not add his wrath to that of God, who has reduced Isernia to ruins in an earthquake; and so he abstains from sacking the ruined city.

With the exception of the Abū Ma'shar episode, the text of the *Chronica* is repeated in almost the same words by Leo Ostiensis in that part of the *Chronica Monasterii Casinensis* which he wrote in the second half of the 11th century, and it adds nothing to the information provided by the earlier *Chronica*. The only point on which Leo disagrees with the earlier work is the date of the earthquake. He gives 847, and does not indicate the month (p.82, note 6).

height of the front wall of the colonnaded atrium (the structural damage at its base is indicated in the drawing by an arrow), has been calculated by S.Gibson at about 15 metres, on the basis of the likely static loads of the surviving sections of wall (100 cm thick at the highest surviving level). This is a rubble-filled wall of limestone blocks of various sizes arranged in "Flemish bond". A suggested subdivision of the building as between church and atrium has been worked out on the basis of the above-mentioned dimensions given in the *Chronicon Vulturnense*; and the results of a geophysical exploration of the church area in May 1993, which revealed both the presence of a transverse stone wall about 65 metres from the point at which the maximum chord of the principal apse has been calculated to lie, and a break in the two longitudinal lines along the bases of the rows of columns which separated the nave and side aisles.

plate 2. Plan and elevation of a reconstruction of the basilican abbey church of San Vincenzo Maggiore and attached structures. The hatched areas indicate those parts which were brought to light during the 1990-93 excavations. Additions to the plan have been made possible by the geophysical exploration carried out in the church area in May 1993. The position of the damage shown in the drawing in plate 3 below is indicated by an arrow. (Reconstruction by S.Gibson, British School at Rome. Information kindly provided by F.Marazzi, British School at Rome).

Hoffmann, who edited Leo's *Chronica* for the *Monumenta Germaniae Historica*, draws attention to the discrepancy in dating between Leo and his source, as well as the fact that we do not know of any other sources from which he might have taken his dating. However, even a limited examination of the relationship between Leo and his known chronicle sources makes it quite clear that he adopts a positive and implicitly critical attitude towards the dates which they provide. Where, for example, the *Chronica* provide a generic "in those days" (*his diebus*, p.472), Leo tries to be chronologically more precise (p.76): "in the three years after these events, when Sergius II was pope, after the crowning of the emperor Louis" (*triennio post hec Sergio secundo in sede apostolica presidente, a quo Ludovvicus imperator est coronatus*). But, as Hoffmann points out, Leo's corrections are not always accurate. An example is the emperor's division of the Province of Benevento between *Radelchis* and *Siconulf*. Leo dates this to 851, but it actually happened in 849 (p.84). In none of the cases mentioned do we know the source from which Leo could have derived his new chronological information — which, in any case, is not free from error. Given the uncertainty over the two dates, then, it seems preferable to accept 848, as given by the *Chronica*, for it reflects the direct evidence of the monks who experienced the violent tremors and were themselves in a position to know that the fabric of the monastery buildings remained intact (*similique vim fuit terremoti ad Benedicti beati coenobium, sed nec unus quidem lapidis suo de loco labsum est*).

Ariano Irpino can probably be added to the list of places struck by the earthquake, for its cathedral was damaged in an earthquake in the mid-9th century, according to a plaque put up in the church in 1736, when it was rebuilt after being destroyed in the earthquake of 1732. The date given in the inscription is 858, but it seems likely that it should be corrected to 848 (see Pantosti and Valensise 1989, p.547, fig.307).

Recent archaeological studies on the church of San Vincenzo al Volturno have been carried out by the British School at Rome (see plates 1, 2 and 3).

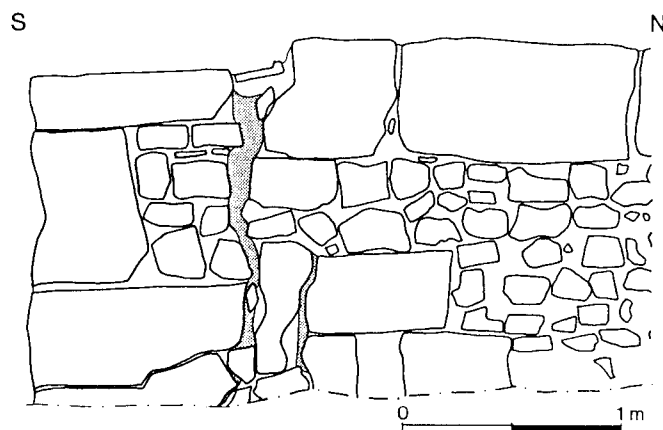


plate 3. San Vincenzo al Volturno (Province of Isernia). Abbey church of San Vincenzo Maggiore (building completed in 808). South-east corner of the front wall. There is a deep vertical crack in the facing, which decreases in size towards the foot of the wall and is responsible for the separation of the corner stones from the rest of the stonework. This damage has been interpreted as resulting from the earthquake of 848. (Drawing by K.Francis, British School at Rome).

〈266〉 **a night in 849-851 Constantinople**

sources [Sym. Magist.] 673
catalogues Guidoboni (1989)

Pseudo-Symeon Magister records a strong earthquake at Constantinople: "Strong earthquake tremors occurred one night; and Photius himself, who had ascended the pulpit to make a speech, said that the earthquakes were not caused by the great number of men's sins, but by the great quantity of water, and that every man has two souls, one of which commits sins, whereas the other is immune from them".

Ἐν μιᾷ νυκτὶ συνέβη γενέσθαι σεισμοὶ μεγάλοι· καὶ αὐτὸς ὁ Φώτιος ἀναβὰς ἐπὶ τοῦ ἁμβωνος δημηγορῆσαι εἶπεν ὅτι οἱ σεισμοὶ οὐκ ἐκ πλήθους ἁμαρτιῶν ἀλλ' ἐκ πλησμονῆς ὕδατος γίνονται, καὶ ἕκαστος ἄνθρωπος δύο ψυχὰς ἔχει, καὶ ἡ μὲν μία ἁμαρτάνει, ἡ δὲ ἑτέρα οὐχ ἁμαρτάνει.

〈267〉 **12 June 853 – 1 June 854 •Tiberias ▸landslide◁**

sources Ibn al-'Imād al-Hanbalī, *Shadharāt al-dhahab* 91
literature Taher (1979)
catalogues Amiran (1950-51); Poirier and Taher (1980)

The 17th century Syrian biographer Ibn al-'Imād al-Hanbalī reports that there were many victims in an earthquake at Tiberias: "During the night, the earth shook at Tiberias. The mountains shook, and then a big rock — eighty cubits by fifty — split open, and so... Many people died".

ورجفت طبرية في الليل حتى مادت الأرض واصطكت الجبال ثم انقطع الجبل المطل عليها قطعة ثمانين ذراعاً طولاً في خمسين ذراعاً فمات منها خلق كثير.

〈268〉 **31 August 853 eastern Sicily**

sources *Cambridge Siculo-Saracen Chronicle* = *Chron. Brev.* 45.10, 1 p.332;
Apocalyptic text (the so-called *Vision of Daniel* "Καὶ ἔσται" in Vasiliev 1893, 39.5-15);
Typicon of S.Salvatore in Messina, ed. M.Arranz (1969, 184.26-7)
literature Alexander (1985); Guidoboni and Traina (1995)
catalogues Guidoboni (1989)

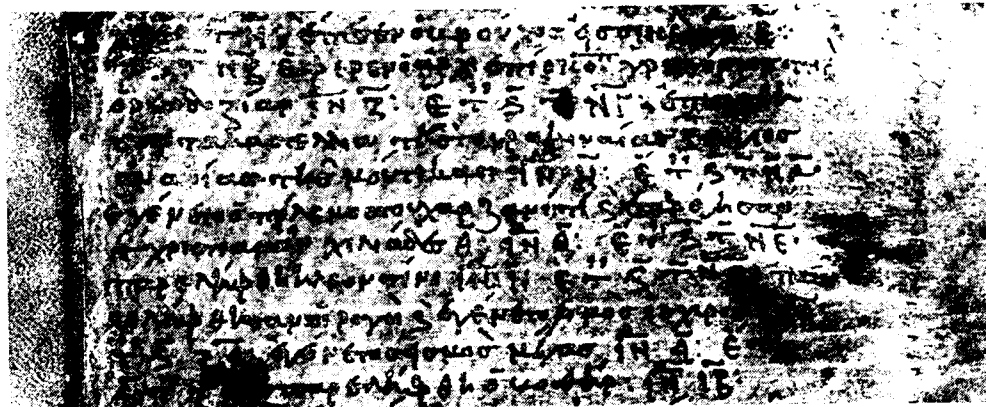
The anonymous author of the *Cambridge Siculo-Saracen Chronicle* records: "There was a great earthquake in the year 6361 [852/853] in the first indiction"

Ἔτους ϷτξϷ' ἐγένετο σεισμὸς μέγας, Ἰνδικτ. α'.

The text does not indicate where the earthquake struck or how much damage it caused. Although it is only mentioned in this one chronicle, it seems to have influenced the apocalyptic literature of the time. Thus, in a Greek translation of what is known as the *Vision of Daniel*, an earthquake is mentioned twice in a prophecy which foretells troubles for the Christian churches: "And the earth will quake from God's anger and will raise a loud groan toward the Lord [...]. And when half of the week is over, the Lord will look upon the earth and make it quake".

καὶ τρομάζεται ἡ γῆ ἀπὸ τῆς ὀργῆς τοῦ θεοῦ [...] καὶ ἐν τῷ πληρωθῆναι τὸ ἥμισυ τῆς εβδομάδος ἐπιβλέψει Κύριος ὁ θεὸς ἐπὶ τὴν γῆν καὶ ποιήσει αὐτὴν τρομάξαι.

It was Alexander (1985, pp.85-7) who identified this earthquake as the one recorded in the brief Sicilian chronicle, on the basis of other historical references in the text. He



Detail of Cod. Vat. gr. 1912, f. 7r, in which there is a brief report of the earthquake of 853 (Biblioteca Apostolica Vaticana).

thinks that two separate earthquakes are being referred to, the first being the one which occurred in Sicily, and the second being the earthquake of 869 at Constantinople (see entry (274)).

The text reads: "And afterwards the sons of Ismael will be afraid and will cry out loud while fleeing to Mariana. And afterwards the sons of Ismael will once again attack the land of Helinia at the request of its inhabitants; others will attack the City of the Rebel of their own accord".

As can also be seen from the Slav translation of Daniel (chap. 4), the city of Mariana was an Arab fortress in Sicily; while the fall of Helinia (Enna) took place in 859, and the "City of the Rebel" can be identified as Syracuse. Alexander (1985) concludes: "The Moslems evidently had been ravaging the territory of Enna and perhaps also attacking Syracuse, had been driven back to their base in Mariana by an earthquake, and were now once again attacking these two cities".

It may be possible to identify the circumstances of the earthquake more accurately from the *Typicon* of the church of San Salvatore in Messina (Ms. Mess. Gr. 115). At f. 160r in this manuscript, which dates to the year 1131, we are told which *anagnōsmata* [Bible readings] are appropriate for 31 August: "three *anagnōsmata* to commemorate the earthquake and the arrival of the barbarians".

Ἀναγνώσματα γ' εἰς τὴν μνήμην τοῦ σεισμοῦ, καὶ εἰς τὴν ἐπέλευσιν τῶν βαρβάρων.

Since the Byzantine liturgy does not record any earthquake for 31 August, it seems logical to deduce that the Messina *Typicon* refers to a local occurrence. The *terminus ante quem* is 1131, when the codex was drawn up, but there is a further clue in the fact that the earthquake is linked to a barbarian invasion. Since, as we have seen, the apocalyptic tradition linked the 852/853 earthquake to the first stage of the Arab invasion of Italy, it almost certainly follows that the date of the earthquake was 31 August 853.

(269) 1-29 April 857 ●Cairo

sources Ya'qūbī, *Ta'rikh* 600

literature Taher (1979)

catalogues Sieberg (1932 a); Poirier and Taher (1980)

The Arab historian and geographer Ya'qūbī is reporting events of his own day when he writes: "In the month of dhu 'l-hijja of that year [242 of the Hegira = 1-29 April 857 AD.] an earthquake in Cairo shook the columns of the mosque (?) and destroyed houses and mosques".

ونال اهل مصر زلزلة عمت حتى اضطرب سوارى المسجد وتهدمت البيوت والمساجد وذلك في ذي الحجة من هذه السنة.

<270> 8 April 859 – 27 March 860 •Maghreb

sources al-Ṭabarī, *Ta'rikh* 3.3.1439
 literature Taher (1979)
 catalogues Poirier and Taher (1980); Maamoun *et al.* (1984)

al-Ṭabarī records a destructive earthquake in the Maghreb and tells of aid provided for the victims by the Caliph: "In that year [245 of the Hegira = 8 April 859 – 27 March 860 AD.], an earthquake destroyed fortresses, buildings and bridges in the Maghreb. [The Caliph] al-Mutawakkil ordered 3,000,000 dirhams to be distributed among the homeless. There were also earthquakes in 'Askar al-Mahdī, near Baghdad, and in al-Madā'in".

وزلزلت في هذه السنة بلاد المغرب حتى تهدمت الحصون والمنازل والقناطر فامر المتوكل بتفرقة ثلاثة آلاف الف درهم في الذي اصابوا منازلهم وزلزل عسكر المهدي ببغداد فيها وزلزلت المدائن.

<271> 30 December 859 – 29 January 860 Adhana, •Antioch, Bālis, Damascus, •Gabala (Jablah), Harrān, Hims, •Laodicea, al-Maṣṣīsa, Edessa [al-Ruhā], Raqqa, Ra's al-'Ayn, Tarsūs, •Mt.Casius, Syria
 ▷landslide◁

sources 1 Ya'qūbī, *Ta'rikh* 601; al-Ṭabarī, *Ta'rikh* 3.3.1439-40
 sources 2 Barhebr. 158
 literature Taher (1979)
 catalogues von Hoff (1840); Mallet (1853); Sieberg (1932 a); Ben-Menahem (1979); Poirier *et al.* (1980); Poirier and Taher (1980)

After mentioning the Maghreb earthquake, al-Ṭabarī goes on to give a more detailed description of another very violent shock which struck Antioch, where 1500 houses and 90 towers collapsed, as well as many other towns along the valley of the river Orontes. It also caused a landslide on Mt.Casius, from which rocks fell into the sea: "In the same year [245 of the Hegira], in the month of shawwal [30 December 859 – 29 January 860], there was an earthquake at Antioch which killed a large number of people, as well as causing the collapse of 1500 houses and about 90 towers in the walls of the city. Dreadful and indescribable rumbling noises were heard, and people fled into the desert. Mount Casius (*jabal al-aqra'*) split open and rocks fell into the sea, which was stormy that day. Then, a black and stinking pall of smoke rose from the sea, obscuring the sunlight. A river sank into the ground over a distance of about a parasang [5.6 km] and disappeared. The people of Tinnīs, in Egypt, heard a persistent and terrifying din, and many people were killed. There was another earthquake in the cities of Bālis, Raqqa, Harrān, Ra's al-'Ayn, Hims, Damascus, al-Ruhā, Tarsūs, al-Maṣṣīsa, Adhana and along the Syrian coast. The earthquake reached Laodicea, where no home remained standing. Only a small number of people managed to escape".

وذكر انه كانت في هذه السنة بأنطاكية زلزلة ورجفة في شوال قتلت خلقا كثيرا وسقط منها الف وخمسمائة دار وسقط من سورها نيف وتسعون برجاً وسمعوا اصواتا هائلة لا يحسنون وصفها من كوى المنازل وهرب اهلها الى الصحارى وتقطع جبلها الأقرع وسقط في البحر فهاج البحر في ذلك اليوم وارتفع منه دخان اسود مظلم منتن وغار منها نهر على فرسخ لا يدرى اين ذهب وسمع فيها فيما قيل اهل تنييس في مصر ضجة دائمة هائلة فمات منها خلق كثير وفيها زلزلت بالس والركة وحران ورأس العين وحمص ودمشق والزها وطرسوس والمصيصة وأدنة وسواحل الشام ورجفت اللاذقية فما بقى منها منزل ولا افلت من اهلها الا اليسير.

According to Ya'qūbī, the earthquake destroyed the cities of Laodicea and Jablah: "During some months of the year 245 [of the Hegira], Syria was struck by earthquakes which destroyed Laodicea and Jablah. Many people were killed, and the inhabitants finally decided to abandon their homes and seek refuge in the desert".

واصابت الشام كله زلازل حتى ذهبت الالذقية وجبله ومات عالم من الناس حتى خرج الناس الى الصحراء واسلموا منازلهم وما فيها واتصل ذلك شهورا من سنة ٢٤٥.

<272> **28 May 862 •Constantinople**

- sources 1 Theoph. Cont. 196.22-30; Nicet. Paphlag., PG 105, 525; Georg. Mon. 2.12; *Patr. Const.* 2.273.1-5; [Sym. Magist.] 677.5-7; Scylitz. 107. 51-6
- sources 2 Genes. 105; Cedren. 973; Zon. 2.162
- catalogues Bonito (1691); von Hoff (1840); Mallet (18653); Downey (1955); Grumel (1958); Hermann (1962); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

Theophanes Continuatus records a particularly serious earthquake on Ascension Day [28 May] 862: "Moreover, repeated earthquakes were causing damage and making buildings collapse. One of them, in fact, occurred on the day of the Ascension of our Lord and Saviour, and razed the southern third of the *exokionion* to the ground, destroying splendid churches, luxurious homes and statues, such as that of Victory at the Golden Gate, and those in the church of St. Anne at the Deuteron".

Τὰ δὲ οἱ συνεχεῖς τῶν σεισμῶν ἐλυμαίνοντό τε καὶ πρὸς τοῦδαφος ἔβαλλον, νῦν μὲν καθ' ἣν ἡ τοῦ Κυρίου καὶ Σωτῆρος ἡμῶν ἀνάληψις ἐορτάζεται, τὸ πρὸς νότον τρίτον τοῦ Ἑξακιονίου πρὸς γῆν ἐδαφίζοντες, ναοὺς τε εὐπρεπεῖς καὶ οἴκους λαμπροὺς, νῦν δὲ στήλας τὴν τε κατὰ Χρυσὴν πύλην τῆς πόλεως Νίκην ἐγκαθιδρυμένην τὰς τε ἐν τῷ Δευτέρῳ κατὰ τὴν ἁγίαν Ἀνναν στερρῶς ἱσταμένας ἐγκατασεύσαντες.

John Scylitzes adds the collapse of the city walls to the recorded damage at Constantinople: "There were also some violent earth tremors. The most powerful occurred on the day when the Ascension is celebrated. It shook the ground in the *exokionion* and brought down the city walls and splendid temples and beautiful houses and the statue of Victory at the Golden Gate, and it also caused the collapse of the statues in the church of St. Anne at the Deuteron".

Ἐγένοντο δὲ καὶ κλόνοι γῆς φρικωδέστατοι. εἷς δὲ ὁ μέγιστος, καθ' ἣν ἡμέραν ἡ τοῦ Κυρίου ἀνάληψις ἐορτάζεται, τὴν γῆν κατασεύσας τό τε κατὰ τὸ Ἑξακίονιον πρὸς γῆν ἠδάφισε τεῖχος καὶ ναοὺς εὐπρεπεῖς καὶ οἴκους λαμπροὺς καὶ τὴν κατὰ τὴν Χρυσὴν πύλην τῆς πόλεως ἱδρυμένην Νίκην καὶ τὰς ἐν τῷ Δευτέρῳ κατὰ τὴν ἁγίαν Ἀνναν παγίας ἱσταμένας κατέσεισεν.

Pseudo-Symeon Magister reports: "When the earthquake occurred, the statue on a column in the church of St. Anne at the Deuteron fell down".

Σεισμοῦ γὰρ γεγονότος ἐπεπτώκει τὸ ἄγαλμα ὃ κατὰ τὴν ἁγίαν Ἀνναν τὸ δεύτερον ἐπὶ κίονος ἵστατο.

Genesius takes up the earlier tradition, but only reports the collapse of the statue in the church of St. Anne. Nicetas Paphlagon dates the earthquake to August.

Downey (1955, p.599) identifies two earthquakes: one in 862, as recorded in Theophanes Continuatus, and the other between 25 March and 21 April 866, as described by Pseudo-Symeon Magister. It is likely that there was in fact only one earthquake, since the description of collapses given by Theophanes Continuatus, Johannes Scylitzes and Cedrenus on the one hand, and by Pseudo-Symeon Magister and Genesius on the other, draws particular attention to the collapse of statues in the church of St. Anne at the Deuteron.

⟨273⟩ **13 February 863 •Dvin**

- sources 1 Joh. Cathol. 133-4; Stephen of Tarōn 2.2; Movs. Dasxur. 2.11;
Calend. Palest.-georg. in Garitte (1958, p.158);
- sources 2 Thom. Arts. 3.22; Sam. An. 312
- literature Garitte (1958); Laurent (1980)
- catalogues Mallet (18653); Abich (1882); Kostaneanc' (1902); Grumel (1958); Hermann (1962);
 Step'anyan (1964); Kondorskaja and Shebalin (1977); Ambraseys and Melville (1982);
 Karapetian (1991)

This major earthquake is recorded not only in seismological catalogues (Abich 1882; Step'anyan 1964; Kondorskaya and Shebalin 1977; Karapetian 1991) but also in earthquake lists compiled by historians (Kostaneanc' 1902; Grumel 1958; Hermann 1962). Some dating problems will be found, however, because the particular seriousness of the earthquake led to the fairly arbitrary creation of doublets. At that time, in fact, the residence of Dvin was almost the only city in Armenia (then governed by the Arab caliphs — see Laurent 1980) to be substantially inhabited by a variety of ethnic groups.

John Catholicus records an earthquake at the royal residence at Dvin, after the death of Ashot Bagratuni "prince of princes". He writes: "At this time, a severe earthquake in the city of Dvin caused great damage to houses, city walls and palaces. Desolation and tremors filled the city and caused many victims. The fear of disaster was so immense, that no-one remained indoors, but lamenting their hardships all fled to the market places and streets. The stinging frost of winter augmented their distress, so that many suffered frostbite from the cold".

Բայց զայսու ժամանակաւ ահագին իմն շարժմանց եղելոց ի Դւին քաղաքի, բազում սասանութիւնս եւ փլուզումնս տանց եւ պարսպաց եւ ապարանից լինէր, եւ առհասարակ քանդումն եւ դրդումն առնոյր քաղաքն. այլ եւ մահ յոլովից մարդկան ի վերայ հասանէր. եւ այնպէս ահագին իմն լինէր վտանգ տագնապին՝ մինչեւ ոչ ոք մնալ ընդ յարկաւ, այլ ի հրապարակս եւ ի փողոցս ելեալ հաշեալ հառաչէին: Իսկ ցրտաշունչ սառնամանիք ձմեռայնուոյն առաւել բերէր զլքացումն հեծութեան, զի յոլովք մտեալք եւ ծայրատեալք լինէին.

Stephen of Tarōn records: "In his time [that of Prince Ashot Bagratuni], during Lent, on the day of little Saturday, there was a terrifying earthquake which killed many people and destroyed luxurious houses, and it lasted for three months".

Եւ տեա աւուրս, յժք թուականին ի քառասուներորդս պահոց ի փոգրիկ շաբաթուն եղել շարժումն ահագին եւ զբազումս կոտորեաց եւ զգեղեցիկ շինուած տապալեաց, եւ տեւեաց մինչեւ ի ժամանակս երից ամսոց.

Moses Dasxuranc'i gives a later date and records: "In the 318th year of the Armenian era [869-870] there was a terrible earthquake at Dvin, which remained active for a whole year and swallowed up 120,000 people into the abyss. This was an example for the admonition of Man".

Եւ յ318 թուականին Հայոց անհնարին եւ հիացուցանող շարժ Դվնայ, որ զամ մի ողջոյն դողացեալ խորասուզեաց յանդունդս անձինս իբրեւ երկոտասան բիւր մարդկան: Ահա նմանութիւն խրատոյ այս ի մարդ:.

The 10th century *Palestine-Georgian Calendar* records at 13 February: "On 13 February there was an earthquake on the feast of St.Denetrius [= Demetrius] and Martinianus Monachus".

օգ. ԹձԺ, Յ(ժօլօ)օժ ճընջ(ը)յէօ (օօի), ճձ ժճր(ո)նօժճճճճ ժօնճճճճճճճ.

Garitte (1958, p.158) has pointed out that in the Byzantine liturgy, the feast of

St.Demetrius of Thessalonica is held on 26 October, which is the date of the two earthquakes in 740 and 989 (see entries <247> and <298> respectively).

That the earthquake occurred in 863 is confirmed by Samuel of Ani, who records it for the year 312 of the Armenian era.

In writing about the 893 earthquake at Dvin (see entry <277>), Thomas Artsruni records: "This earthquake [893 A.D.] was more severe than the one in the time of Zachariah Catholicus of Armenia, after the seventh year of the Armenian captivity".

Այս շարժումն սաստնագոյն քան որ եղել յամս Զաքարիայի Հայոց կաթողիկոսի, յետ է ամի գերութեանն Հայոց:

This chronological reference would take us to the year 859/860, but it is unfortunately rather vague. The date of the earthquake varies between 861 and 869. This was a difficult time for Armenia, which was then under Arab domination, and given the uncertainty in the use of chronological systems, it is possible that historians had difficulty in establishing when the earthquake really occurred.

<274> 9 January 869 •Constantinople

sources 1 Phot. *epist.* 2.70; [Nic. Paphlag.] *Vita Ignatii*, PG 105, 549; *Script. Orig. Const.* 278 [Sym. Magist.] 688; Leo Gramm. 470

sources 2 Theoph. Cont. 322; Zon. 434-5

catalogues Bonito (1691); Mallet (1853); Downey (1955); Grumel (1958); Shebalin *et al.* (1974); Papazachos and Papazachos (1989); Guidoboni (1989)

In recording this destructive earthquake, Pseudo-Symeon Magister adds a curious detail about Leo the Philosopher, who survived by taking shelter with a few others underneath an arch: "In the third year of his reign [that of Basil I], during the feast of St.Polyeuctus, there was an earthquake that lasted for forty days and forty nights, and many churches collapsed, including that of St.Mary in the Sigma, so that all those who were inside singing psalms were killed. Leo the Philosopher, who happened to be there, urged everyone to go outside, but since they took no notice they were all killed. Leo himself and two others escaped harm by clinging to a column under an arch, and the only other survivors were nine people who took refuge under the pulpit".

Τῷ γ' αὐτοῦ ἔτει, τῇ ἑορτῇ τοῦ ἁγίου Πολυεύκτου, γέγονε σεισμός ἐπὶ μ' ἡμέρας καὶ μ' νύκτας, καὶ ἐπτοήθησαν πολλά ἐκκλησίαι, μεθ' ὧν καὶ ἡ ὑπεραγία Θεοτόκος ἡ λεγομένη τὸ Σίγμα, ὥστε πάντα τοὺς ψάλλοντας ἐκείσε τελευτήσαι. Λέων ὁ φιλόσοφος τυχὼν ἐκεῖ παρῆναι πάντας ἐξελεῖν· οἱ δὲ μὴ πεισθέντες συνετελέσθησαν ἅπαντες. αὐτὸς δὲ ὁ φιλόσοφος εἰς κίονα ὑπὸ συσταματίου σταθεὶς μετὰ καὶ ἐτέρων δύο ἐσώθη, καὶ ἕτεροι θ' ἄλλοι ὑποκάτω τοῦ ἁμβωνος.

Leo Grammaticus adds to the list of damage by mentioning that the globe with the signs of the zodiac in the forum also collapsed: "There was a very severe earthquake on the feast of St.Polyeuctus, and the earth shook for forty days and as many nights. The globe of the zodiac near the forum and the church of St.Mary in the Sigma collapsed, and all those who were singing psalms in the church lost their lives. Leo the Philosopher, who happened to be there, invited those who were singing psalms and all the other people in the church to leave, but they took no notice of him and were killed. He himself stood beside a structure with two others and was unharmed, as were only five others who took refuge under a pulpit".

Ἐγένετο δὲ σεισμός τοῦ ἁγίου Πολυεύκτου μέγιστος, ὥστε τὴν γῆν σειέσθαι ἐπὶ τεσσαράκοντα ἡμέρας καὶ τεσσαράκοντα νύκτας· ἔπεσε δὲ τότε καὶ ἡ σφαῖρα τοῦ ζώδου τοῦ φόρου καὶ τῆς ὑπεραγίας Θεοτόκου τὸ Σίγμα, ὥστε πάντας τοὺς ψάλλοντας

ἐκεῖσε τελευτῆσαι. Λέων δὲ ὁ φιλόσοφος τυχὼν ἐκεῖσε ἔλεγεν τοῖς ψάλλουσιν καὶ παῖσιν τοῖς οὖσιν ἐκεῖσε ἐξελθεῖν τῆς ἐκκλησίας· οἱ δὲ μὴ πεισθέντες αὐτῷ συνετελέσθησαν ἅπαντες. αὐτὸς δὲ ὁ φιλόσοφος εἰς κίονα ὑπὸ συστημάτιου σταθεὶς μετὰ ἐτέρους δύο διεσώθη, καὶ ἕτεροι πέντε μόνοι ὑποκάτω τοῦ ἄμβωνος.

This is probably the same earthquake as the one reported to have occurred in the 9th century in the *Scriptores Originum Constantinopolitanarum*, according to which parts of the walls of Constantinople collapsed: "Three hundred and twenty-eight years later, there was a terrible and violent earthquake, during the reign [of Basil], in the royal palace area. After the destruction of Michael [the church of St. Michael at Anaplis by the Bosphorus], the temple was also destroyed on the Lord's Day, that being the feast of St. Polyeuctus, and all those who were inside lost their lives. Since that time, such an occurrence has been called a seism, which it had not been called before".

Μετὰ δὲ τμη' ἔτη σειсмоῦ φοβεροῦ καὶ ἐξαισίου γεγονότος εἰς τὴν αὐτοκρατορίαν Βασιλείου μετὰ τὸ ἀναιρεθῆναι Μιχαὴλ συνεπτώθη ὁ ναὸς ἐν ἡμέρᾳ κυριακῇ, μνήμη τοῦ ἁγίου Πολυεύκτου, καὶ τοὺς ὄντας κακεῖσε πάντας διέφθειρεν· καὶ ἔκτοτε ἐκλήθη σεισμός, ἐπεὶ πρῶτον οὐκ ἐκαλεῖτο οὕτως.

Downey (1955, p.599), uses the *Synaxarium Ecclesiae Constantinopolitanae* 380.19-23 to confirm the dating of the earthquake to 9 January. However, the *Vita Ignatii* attributed to Nicetas Paphlagon puts it in August.

〈275〉 16 May 881 Tanġa, Tilimsān, Andalusia, Egypt, Mesopotamia, North Africa, Syria

sources Ibn al-Athir, *al-Kamil fī'l-ta'rikh* 7.252; Ibn Abi Zar', *al-Anis al-Mutrib* 1.136-7

literature Taher (1979)

catalogues Sieberg (1932 a); Roux (1932); Amiran (1950-51); Heck (1947); Ben-Menahem (1979); Poirier and Taher (1980)

Two 12th-13th century Arab historians refer to a violent earthquake affecting many parts of the Mediterranean basin, but they do so in very general terms. This may be a case of two separate events which occurred within a short space of time and are covered by a single description. According to Ibn al-Athīr: "In that year [267 of the Hegira = 12 August 880 – 31 July 881 A.D.] there was a strong earthquake in Syria, Egypt, some parts of Mesopotamia, North Africa and Andalusia. The earthquake was preceded by a powerful rumbling noise".

وفيهما كانت زلزلة عظيمة بالشام ومصر وبلاد الجزيرة وافريقية والاندلس وكان قبلها هدة عظيمة قوية.

Ibn Abi Zar' specifies the exact day when the tremor was felt: "In the year 267, on Thursday 12 shawwal [16 May 881] there was an earthquake unlike any that had been heard of before. It destroyed strongholds and removed rocks and mountains. Because of the strong tremors, people fled from the towns and took refuge in the desert. Houses and walls collapsed, and birds fled from their nests, vanishing into the air until the earthquake ended. The shocks struck the enemy's lands, from Tanġa to Tilimsān, and the whole of al-Andalus, from the coast to the mountains".

وفي سنة سبع ستين ومائتين في يوم الخميس الثاني والعشرين من شوال منها كانت زلزلة ما سمع الناس بمثلها قبلها، تهدمت القصور وانحطت منها الصخور والجبال وهرب الناس من المدن إلى البرية من شدة اضطراب الأرض وتساقط السقوف والحيطان والدور وفرت الطيور عن أوكارها وفراخها وما جت في الهواء زمانا حتى سكنت الزلزلة. وعمت هذه الزلزلة بلاد العدو من طنجة إلى تلمسان وجميع بلاد الاندلس سهلها وجبالها من البحر.

⟨276⟩ 13 November - 11 December 885 ●Cairo, ●Egypt

- | | |
|------------|---|
| sources 1 | al-Tabarī, <i>Ta'rikh</i> 3.4.211; Ibn Batriq, <i>Ta'rikh</i> 2.71 |
| sources 2 | Elias Nisib. <i>Syr. versio</i> 188 |
| literature | Taher (1979) |
| catalogues | von Hoff (1840); Mallet (1853); Sieberg (1932 a); Grumel (1958); Poirier and Taher (1980); Maamoun <i>et al.</i> (1984) |

al-Ṭabarī refers to chronicles which he does not identify, and reports that a violent earthquake destroyed a mosque in Cairo and killed a great many people: “It was said in the chronicles that in the month of Jumada II of that year [272 of the Hegira = 13 November – 11 December 885 A.D.] an earthquake destroyed the congregational mosque in Cairo. 1000 funerals were counted in a single day”.

ووردت الاخبار فيها ان مصر زلزلت في جمادى الآخرة زلازل اخرت الدور والمسجد الجامع وانه اُحصى في يوم واحد بها الف جنازة.

Ibn Batriq dates the earthquake to a year later: “In the eighteenth year of the caliphate of al-Mu’tamid, that is to say 273 [of the Hegira = 8 June 886 – 27 May 887 A.D.], there was a terrible earthquake in Egypt: many houses collapsed and many people lost their lives”.

و في ثمانى عشرة سنة من خلافة المعتمد و هي سنة ثلاث و سبعين و مائتين كانت بمصر رجفة عظيمة و سقطت دور كثيرة و مات فيها خلق عظيمة

Ibn Baṭrīq also records that the earthquake caused a rise in the price of grain, and that there was a famine.

Elias of Nisibis provides the same information: "The year 272 [of the Hegira] began on Friday 18 Haziran [June 885 A.D.] in the year 1196 of the Greeks. Muhammad bar Yahya. Abū Ja'far al-Tabarī [...]. In that year there was an earthquake in Egypt, and many houses collapsed, as well as the great mosque. In it a thousand people died in a single day.

[illegible]

⟨277⟩ the night of 27 December 893 ●Dvin

- | | |
|------------|---|
| sources 1 | Joh. Cathol. 162-3; an unpublished letter written by bishop Maštoc', in Ms. arm. San Lazzaro 47; al-Tabarī, <i>Tarikh</i> 3.4.2139; Th. Arcr. 3.22; two colophons in Yovsēp'ean (1951, nos. 31 and 35) |
| sources 2 | Elias Nisib. <i>Syr. versio</i> 192-3 |
| literature | Saint-Martin (1851); Cuneo (1988); Abrahamyan (1976); K'alant'aryan (1992); K'alant'aryan <i>et al.</i> (1992) |
| catalogues | von Hoff (1840); Mallet (1853); Abich (1882); Kostaneanc' (1902); Sieberg (1932 a); Grumel (1958); Hermann (1962); Step'anyan (1964); Kondorskaja and Shebalin (1977); Ben-Menahem (1979); Ambraseys and Melville (1982); Karapetian (1991) |

The late 9th century earthquake at Dvin was the most serious seismic event in the region of Armenia before the year 1000. Apart from its intensity, its historical importance lies principally in the fact that it struck what was then almost the only large

city in Armenia. Dvin was in fact the capital of Armenia during the Arab occupation and, besides being a centre of political and religious power (it was the seat of the Armenian patriarchate), it must have been quite densely populated, as archaeological research has shown (see the bibliography in Cuneo 1988).

John Catholicus records: "At about this time, severe tremors occurred unexpectedly during the night in the city of Dvin, causing extensive destruction, terror, ruin and loss of life; for the earthquake caused the city walls to collapse, and both the palaces of the magnates and the houses of the common people became desolate areas of rubble in the twinkling of an eye. It also demolished the divinely-built church of the katholikosate as well as the other martyria with solid foundations, so that they appeared to onlookers almost like holes full of rocks. The suffering of countless people, who suffocated under their roofs and mounds of earth because their hearts had become of stone and without compassion, made them resort to lamentation and tearful cries. I shall not speak of the victims' relatives, sympathisers and spouses, whose cries and lamentations, together with the piteous voices of the chorus of minstrels, accompanied by the wailing of women in black and grief-stricken men, rose to the heavens. As it was not possible to bury the great number of corpses in graves, many were thrown into abysses, ravines and gorges".

Զայսու ժամանակաւ ահագին իմն հեղակարծումն: ժամու սաստիկ շարժմանց եղելոց ի գիշերի ի Դուին քաղաքի՝ բազում սասանումն եւ սարսափումն եւ դրդումն եւ կործանումն զբնակչօք քաղաքին զեղեալ, հիմն ի վեր տապալէր: Վասն զի առհասարակ ի վայր փլուզեալ զպատուար պարսպացն եւ զապարանս գլխաւորացն եւ զտունս ռամկաց՝ իբրեւ զերիզուտ վայրս առապարաց յական թօթափել տեսանէր. այլ եւ զաստուածաշէն եկեղեցին կաթողիկոսարանին եւ զայլ եւս հաստահեղոյն վկայարանս՝ դրդեալ քանդեալ աւերեալ ի վայր հոսէր. որ գրեթէ իբրեւ զփապարս վիմուտս դերբկաց սարսափելի տեսողացն երեւէր: Այլ եւ հեղձամղձուկ յարկածաճուկ հողաթաւալ հողահեղձոյց սատակումն դիակոյտ բազմութեանն, որ կարծրագոյն քարեղէն եւ անկարեկին միտս էր ստացեալ՝ յարդարէր զնա ի բազում ողբ եւ յարտօսրաթոր կականմունս: Թողում ասել զազկակիցս եւ զկարեկիցս եւ զլճակից հարազատութիւն մարդկան, որոց կականումն եւ ողբումն եւ աշխարումն գուժից. ճշոյ եւ կանչոյ եւ կառանչոյ, եւ աղիողորմ ծայնք երկեցիկ կուսանաց եւ սեւազգած կանանց, եւ արանց վշտահար հեծութեամբ սգացելոց՝ մինչեւ յերկինս բարձրացեալ հասանէր: Իսկ զբազմութիւնսն դիականցն ոչ բաւեալ տալ գերեզմանաց՝ զբազումս ի վիհս եւ ի խորափիտս եւ ի դարափլակս ընկեցեալ ծածկէին:

Thomas Artsruni records: "In the third year of his [Prince Smbat Bagratuni's] reign over Armenia, God's anger caused the innermost depths to crash together with tremblings and shakings in the abyss like agitated torrents. The lowest part of the earth collapsed and was firmly locked in the region of Sandaramet [the divinity of the underground]; fierce winds blew over the darkened waters, trampling down the deep, solid foundations of the earth and causing its thick, dense and immeasurable infinity to heave, until it burst onto the surface of the earth opposite the city of Artashat, which is called Blur, where the capital city of Dvin stands. This populous [city], surrounded by fortified ramparts and swarming and teeming with commerce and all kinds of impurity, was completely destroyed. Hell opened its mouth wide and swallowed into its depths great numbers of people. For some their houses became their tombs, just as it swallowed up the houses of the army of the Korahites [Numbers 16.30-4]. God who had earlier spared the repentant Ninevites [Jonah 4.11], now had no pity for the stony hearts of the citizens of Dvin. Even the holy places and houses of prayer were a prey to the earthquake, their walls cracking and collapsing, as on the death of king Ozias in the days of the prophet Isaiah, when at the voice of the seraphim the temple of the Lord was shaken and its doorposts destroyed [Isaiah 6.4]. Similarly in the time of Zechariah the prophet there was an earthquake as far as the

Mount of Olives [Zach. 14.4]. It is said that the number of people killed by the earthquake was more than seventy thousand. This earthquake was more severe than the one in the years of Zachariah Catholicus of Armenia, after the seventh year of the Armenian captivity [see entry <273>]. The blessed bishop Grigor, prelate of Rštunik⁴ also happened to be there. He was unable to escape with his companions, since they were then at prayer on the mountain. So some of them were buried in that spot by the same earthquake”.

Ի սորա յերրորդ ամի Թագաւորութեանն ի վերայ Հայոց աստուածատուր բարկութեամբ շանդնդաշարժ վրդովմամբք ներքագոյն խորոցն պատահեալ միմեանց սահանախաղաց դրդովմամբ, հիմնաշարժ տապալմամբ, ներքագոյն երկիր թուլացեալ պնդափակ աղիւեալ սանդարամետական սահմանին, բարկութեան հողմոց շնչեալ ընդ ջրոցն խաւարայնոց, ի կոհակս անդնդաքակս զթանձրայատակ երկրի զկարծր եւ զծանրալիր անկշիռ անբացութիւնն տատանեալ, մինչ յերեսս երկրի ի վեր մղեալ հանդէպ քաղաքին Արտաշատու, որ Բլուր նորուն ասի, յորում շահաստանն Դուին, մարդախիտ պարսպաւոր պատնիշօք պատուարեալ եւ տուրեւառիկ վաճառականութեամբ եւ ազգի պղծութեամբ յափրացեալ յղկացեալ՝ զնա ի հիմանց տապալեալ. բերանաբաց դժոխաբար լայնեալ զբերան իւր՝ յոգունց քան թէ սակաւ ուց արար վիժել յանդունդս, որոց ոմանք եւ տունք նոցա գերեզմանք նոցին եղեն: Գունակ Կորիային բանակին յանդնդաքակ տունսն զբնակութիւնսն արարին, անխայեալ ի նիւնէականն ստրջացեալ նախ անդ ո՛չ անխայեալ առ քարեղէն սիրտ քաղաքացւոցն Դուինայ: Նա եւ տեղիք սրբութեանց տունք աղօթիցն զշարժմանն կիրս կրեալ, պատառմամբ որմաշարժ լինելով, որպէս յայնժամ ի մահուն Ոգիայ արքայի, յաւուրս ետայեայ մարգարէի՝ ի ծայնէ սրովբէից շարժեալ տաճարին տեառն, մինչ բարձրանալ դրանդեացն: Որպէս եւ առ Զաքարիայի մարգարէի շարժեալ մինչ ի լեառն Զիթենեաց: Եւ ասի լինել թիւ մարդկանն ապականելոց ի շարժմանէ՝ ոգի առաւել քան Հո: Այս շարժումն սաստագոյն քան որ եղել յամս Զաքարիայի Հայոց կաթողիկոսի, յետ է ամի գերութեանն Հայոց: Անդ հանդիպեալ լինէր եւ երանելի եպիսկոպոսն Գրիգոր Ռշտունեաց վսեմ. ոչ կարաց իւրայովքն զերծանել, իբրեւ յայնժամ աղօթաւ ի լեառն: Եւ նորայքն ոմանք ի նմին շարժմանէ գերեզմանացան ի նմին:.

The colophon of an Armenian gospel (ms. Tübingen 13.4) records: “[It was written... in the year 893] In that year the city of Dvin was destroyed. Many people lost their lives and the churches were knocked down. [God] did these things to purge our sins”.

Յորում ամի կործանեցաւ Դուին քաղաք ի շարժմանէ եւ բազումք մեռան եւ եկեղեցիք տապալեցան: Այս իրս գործեցաւ վասն ծովացեալ մեղաց իմոց:

The colophon in the Ejmiadzin ms.977/70 provides similar information.

In a recent note, the Armenian textual scholar Abrahamyan (1976, cc.139-44) tried to correct the date of this earthquake, placing it in 894 instead of 893, on the basis of the computation of Easter and the whole calculations in the colophon. But he failed to take the Arabic sources into account and, as we shall now see, they supply some very useful additional information. The fact is that this earthquake was not solely of interest to the Armenian tradition: since, as we have pointed out, Dvin was ruled by the Arab caliphate, the earthquake attracted the attention of central government. As al-Ṭabarī records, Baghdad was therefore sent a letter which reveals the exact date of the earthquake: “In that year [280 of the Hegira = 23 March 893 – 12 March 894 A.D.] in the month of dhu ’l-hijja [11 February – 12 March 894 A.D.] a letter from Dabil [Dvin] reported a lunar eclipse on 14 shawwal [27 December 893 A.D.], which lasted all night long. When people woke up in the morning, they found the earth wrapped in persistent darkness. In the afternoon a strong and black wind rose up and lasted until a third of the night. After the wind, the earth shook. In the morning, people saw that the town had disappeared; only 100 houses were still standing. According to the let-

ter, 30,000 people were taken from the ruins and buried. After the first shock, five more followed. It was said that the total number of victims in the ruins was 150,000".

وفيهما فيما ذكر في ذي الحجة ورد كتاب من ديبيل بانخساف القمر في شوال لاربعة عشرة خلت منها ثم تجلى في آخر الليل فأصبحوا صبيحة تلك الليلة والدنيا مظلمة ودامت الظلمة عليهم فلما كان عند العصر هبت ريح سوداء شديدة فدامت الى ثلث الليل فلما كان ثلث الليل زلزلوا فأصبحوا وقد ذهبت المدينة فلم ينج من منازلها الا اليسير قدر مائة دار وانهم دفنوا الى حين كتب الكتاب ثلاثين الف نفس يخرجون من تحت الهدم ويدفنون وانهم زلزلوا بعد الهدم خمس مرات وذكر عن بعضهم ان جملة من اخرج من تحت الهدم خمسون ومائة الف ميت.

Elias of Nisibis takes up the report given by al-Ṭabarī.

This was a very severe earthquake and caused the catholicate to be moved from Dvin to its present seat at Valarshapat (present-day Echmiadzin). Recent excavations in the cathedral and palace area of the Kat'olikos (see K'alant'aryan 1992, and K'alant'aryan *et al.* 1992) have made it possible to identify traces of the earthquake. For the city buildings in general, see Cuneo (1988, pp.114-7). For later Arabic sources which use al-Ṭabarī, see Ambraseys and Melville (1982, p.175, note 33).

In some catalogues, this earthquake has given rise to problems of location. The most recent regional catalogue (Karapetian 1991) records an earthquake at "Ardebil" in the year "869", but this is in fact the famous earthquake at Dvin on 27 December 893. What has happened is that the catalogue tradition has confused the city of Ardebil (in Azerbaijan) with the place-name Dabil recorded by the Arab historian al-Ṭabarī, this being the Arab name for Dvin (see Saint-Martin 1851, p.403, note 50). In fact, the basic source of the mistake lies in the difficulty experienced by medieval writers in identifying the place-name Dabil. Grumel (1958) made the same mistake, thereby creating an earthquake doublet, for he placed one at Dvin in 892 and one at "Dabel" on 23 September 893, using Elias of Nisibis as his source. This confusion can already be found in Barhebraeus, who locates an earthquake in India in the year 893. As Ambraseys and Melville (1982, p.174, note 133) have already pointed out, this caused 19th century seismologists to locate the earthquake in Pakistan. The date of the earthquake is debated. The excellent evidence provided by al-Ṭabarī suggests 27 December 893, while the chronographical calculations carried out by Abrahamyan (1976) lead him to suggest the year 894.

<278> 894 Apulia, Samnium

sources *Cat. reg. Lang. et ducum Benev.* 496

literature Poupardin (1907)

catalogues Capocci (1861); Mercalli (1883); Baratta (1901); Carrozzo *et al.* (1973); Guidoboni (1989)

There is a brief mention of this earthquake in an anonymous *Catalogus regum Langobardorum et ducum Beneventanorum*, in Vatican Codex 5001 (ff.140v-142r) which was probably written in Benevento in the last decade of the 9th century (Poupardin 1907, pp.18-20).

After noting that Lambert succeeded his father, Guido of Spoleto, on the throne in 894, the chronicler records an earthquake which struck Samnium and Apulia: "Shortly afterwards, a great earthquake occurred throughout Samnium and Apulia. This was followed during the reign [of Lambert] by the burning of half the city of Benevento, from the church of St.Renato to the Porta Aurea; it happened on the same day as the beginning of the siege of the city three years earlier".

Denique hinc factus est eisdem diebus fere per omne Samnium seu Apulia terraemotus ingens. Subsecuta deinde est sub prephato patricio [Lamberto] concrematio ferme

mediae civitatis Beneventanae, ab ecclesia sancti Renati sursum usque portam Auream; eodem die, iam tertio anno completo postquam obsideri eadem cepta fuerat civitas.

The fire in Benevento probably has no connection with the earthquake, but it seems to be related to the long siege which the city underwent. In mentioning the fire, moreover, the author of the *Catalogus* is at pains to stress that both it and the earthquake happened during the reign of Lambert. There would have been no need to mention this if he had intended to convey that one was caused by the other.

⟨279⟩ **c.906 ●K'argop'**

- sources Orb. 44
- literature Cuneo (1988)
- catalogues Abich (1882); Step'anyan (1964); Kondorskaja and Shebalin (1977);
Ambraseys and Melville (1982); Karapetian (1991)

About a century and a half after the great Vayoc' Jor earthquake, another fairly serious seismic event is recorded for the same area, near the monastery of the Vegetarians (Kotakerk') and the village of K'argop'. This latter earthquake is recorded in the seismological tradition (Abich 1882; Step'anyan 1964; Kondorskaya and Shebalin 1977; Karapetian 1991, no.14, gives the generic location Vajoc'-Jor).

Stephen Orbelian mentions that, after the death of Prince Ashot Bagratuni, the church of Xotakerk', also called K'argop' (the information given in Ambraseys and Melville 1982, p.38, is incorrect), was destroyed in an earthquake, together with the monastery: "After the death of the pious and royal Prince Ashot, the church and the whole monastery building were destroyed in a terrible earthquake".

Եւ ապա վախճանի բարեպաշտ եւ արքայաշուք Աշոտ. եւ ի սաստիկ շարժմանէ տապալին եկեղեցիքն եւ ամենայն շինուածք վանիցն.

There follows the correspondence between queen Shushan and bishop John, dated 910, concerning the business of rebuilding church and monastery, which was completed in 911. For the monastery, see Cuneo (1988, p.395).

⟨280⟩ **29 August 911 – 17 August 912 ●al-Bās, Kairouan**

- sources Ibn al-Athīr, *al-Kāmil fi'l-ta'rikh* 8.50; Ibn 'Adhārī, *Bayān al-mughrib* 1.166
- literature Taher (1979)
- catalogues Poirier and Taher (1980)

Ibn al-Athīr refers to earthquakes affecting Tunisia: "In that year there were some earthquakes at Kairouan. Nobody had ever seen such powerful earthquakes before".

وفيهما كانت زلازل بالقيروان لم ير مثلها شدة وعظيمة.

Ibn 'Adhārī reports the same events: "In that year [299 of the Hegira = 29 August 911 – 17 August 912 A.D.] there were some earthquakes at Kairouan; a village on the coast called al-Bās was destroyed".

وفيهما كانت بالقيروان زلازل وهدأت وخسف بقرية في الساحل تعرف بالباس.

⟨281⟩ **29 August 911 – 17 August 912 Egypt**

- sources al-Mas'ūdī, *Murūj* 8.282
- literature Ho Peng Yoke (1962); Maffei (1987); Yeomans (1991)

al-Mas'ūdī — who lived at the time of the events he is narrating — records an earthquake at Kufa (in present-day Iraq), and claims that there was also an earthquake in Egypt in the same year 299 of the Hegira: “There was a hail of stones in Kufa, each one of them weighing a baghdadian *ratl* (2.5 kg). Then a wind blew up obscuring the sunlight and this [happened] in the month of Ramadan. It caused the destruction of houses and other buildings. There was also a strong earthquake which caused the death of many people. It happened in Kufa in the year 299 [of the Hegira = 29 August 911 – 17 August 912 A.D.]. In Egypt too, in the same year, there was a strong earthquake, and a comet appeared”.

ورقع بالكوفة برد عظيم في الواحدة رطل بالبغدادي وريح مظلمة وذلك في شهر رمضان وانهدم كثير من المنازل والبنيان وكان فيها رجفة عظيمة هلك فيها خلق كثير من الناس هذا كان بالكوفة في سنة تسع وتسعين ومائتين وكان بمصر في هذه السنة زلزلة عظيمة وفيها طلع كوكب الذئب.

The comet referred to by al-Mas'ūdī was almost certainly Halley's Comet, for Chinese and Japanese sources record that it passed by in May or — more probably — July 912 (Ho Peng Yoke 1962, p.178; Maffei 1987, pp.203-6; Yeomans 1991, p.387).

The earthquake in Egypt recorded by al-Mas'ūdī may be the one recorded as affecting Tunisia by Ibn al-Athir and Ibn 'Adhārī.

<282> 926/927 ●Thrace ▷subsidence, surface faulting?◁

sources 1 Theoph. Cont. 411; Scylitz. 221 = Cedren. 2.207

sources 2 Georg. Cont. 903; Leo Gramm. 502; Mich. Syr. 549

catalogues Bonito (1691); Mallet (1853); Schmidt (1881); Grumel (1958); Papazachos and Papazachos (1989); Guidoboni (1989)

Theophanes Continuatus records a destructive earthquake which struck many villages of the Thrace: “At that time there was a terrible earthquake in the Theme of the Thracians. It made a huge chasm, which swallowed up many villages and churches”.

Ἐγένετο δὲ καὶ τῆνικαῦτα σεισμὸς φοβερὸς ἐν τῷ θέματι τῶν Θρακησίων, καὶ χάσμα γῆς μέγα καὶ καταπληκτικόν, ὥστε πολλὰ χωρία καὶ ἐκκλησίας αὐτάνδρους καταποθῆναι.

Joannes Scylitzes takes up this report, in almost the same words: “At that time there was an earthquake in the Theme of the Thracians, which created terrible chasms, so that many churches and villages were swallowed up with all their inhabitants”.

Ἐγένετο τῆνικαῦτα καὶ σεισμὸς ἐν τῷ θέματι τῶν Θρακησίων καὶ χάσματα γῆς καταπληκτικά, ὥστε πολλὰ χωρία καὶ ἐκκλησίας αὐτάνδρους καταποθῆναι.

<283> 4 October 935 ●Egypt

sources 1 Ibn Baṭṭīq, *al-Ta'rikh al-majmū'* 28

sources 2 Ibn al-Dawādārī, *Kanz al-durar* 5.301

literature Taher (1979)

catalogues Sieberg (1932 a); Poirier and Taher (1980)

Ibn Baṭṭīq tells of a strong earthquake — its effects are not specified — which struck Egypt at the beginning of October 935: “In the third day of the month of dhu 'l-qa'da [in the year 323 of the Hegira = 4 October 935 A.D.], there was a strong earthquake in Egypt, and a hail of meteorites as well”.

وكان في مصر زلزلة عظيمة ثالث ذي القعدة من هذه السنة والكواكب الشهب اضطراباً شديداً.

The same information, including the hail of meteorites, is taken up by Ibn al-Dawādārī, but he dates the earthquake to the year 321 of the Hegira: "In that year [321 of the Hegira = 1 January 933 – 21 December 933 A.D.], a terrible earthquake struck Egypt, accompanied by a hail of meteorites. Many buildings were destroyed".

وفيهما كان بمصر زلزلة عظيمة هدمت دوراً كثيرة وتساقطت فيها الكواكب.

It is worth mentioning that a hail of meteorites and an earthquake in Egypt were reported by al-Mas'ūdī for the year 299 of the Hegira (see entry <281>).

<284> 2-3 July 944 Cordoba

sources Ibn 'Adhārī, *Bayān al-mughrib* 2.227

literature Taher (1979)

catalogues Poirier and Taher (1980)

In early July 944, the inhabitants of Cordoba were thrown into a state of alarm by an earthquake; and the tremor was followed by a dust storm which destroyed crops.

Ibn 'Adhārī writes: "In that year [332 of the Hegira] on Monday night 9 dhu 'l-qa'da [2 July 944 A.D.] there was a strong earthquake in Cordoba, such as nobody had ever seen or heard before. The earthquake happened in the evening and lasted for an hour. The people of Cordoba were frightened and ran into the mosques crying and praying. [God] came to their aid, turning [the earthquake] away from them. The next morning, a stormy wind blew up, immediately followed by another [earthquake]; both uprooted a great number of trees, including olive-trees, fig-trees and palms, and destroyed many roofs. Then came a rain of dust and big hail stones that killed many beasts and birds. Any cultivation was destroyed, and signs of the disaster persisted for many years".

وفيهما كانت زلزلة عظيمة بقرطبة ليلة الاثنين لتسع خلون من ذي القعدة فلم ير قط مثلها ولا سمع من قوتها ووقعت بعد العشاء الآخرة فدامت ساعة ففزع اهل قرطبة لها فزعا شديداً ولجوا الى المساجد فيها وضجوا بالدعاء الى الله تعالى في كشفها حتى اغاثهم وصرهم وفي صبح ليلة الزلزلة هبّ ريح عاصفة ردتها اخرى فاقتلعا كثير من شجر الزيتون والتين وغيرهما من الاشجار والنخيل وأطارا كثيراً من قرمد السقف ونزل اثر ذلك مطر وابل طبق الارض وبرد غليظ فقتل كثيراً من الوحش والطير والمواشي واتلف ما اصاب من الزرع واساء التأثير.

<285> 945 Constantinople >subsidence?<

sources Theoph. Cont. 441

literature Downey (1958)

catalogues Grumel (1958); Shebalin *et al.* (1974); Guidoboni (1989)

Theophanes Continuatus records a case of subsidence, but there is a great deal of uncertainty as to its cause. The reference has become part of the seismological tradition thanks to Grumel and Downey; but considerable doubt remains about the occurrence: "When the emperors Stephen and Constantine were expelled from the palace on the orders of Constantine Porphyrogenitus [945], deep cracks appeared in the house of John Kourkouas, who was a *magister* and ex-domestic of the Scholae, in that of Romanus the Saronite, *magister*, and in a number of other houses".

Στεφάνου καὶ Κωνσταντίνου τῶν βασιλέων κατενεχθέντων ἀπὸ τοῦ παλατίου προτροπῇ Κωνσταντίνου τοῦ Πορφυρογεννήτου, χωννουβαριασμός γέγονεν ἐν τῷ οἴκῳ τοῦ μαγίστρου Ἰωάννου τοῦ Κουρκούα τοῦ ἀποδομειστικού τῶν σχολῶν καὶ εἰς τὸν τοῦ μαγίστρου Ῥωμανοῦ Σαρωνίτου καὶ εἰς ἑτέρους καὶ διαφόρους οἴκους.

Downey (1955, p.599) and Grumel (1958, p.479) consider this to be evidence of an earthquake, which they date to 948.

<286> 25 July 950 •Cairo

sources al-Nuwayrī, *Nihyat al-arab* 26.18

literature Taher (1979)

catalogues Poirier and Taher (1980)

al-Nuwayrī reports an earthquake which caused damage in Cairo: "On 6 safar in the year 339 [of the Hegira = 25 July 950 AD.] the earth shook in Cairo. The tremors lasted for a long time, causing the collapse of many houses and part of the old mosque (?)".

وفي سنة ٣٣٩ لست خلون من صفر زلزلت مصر وتتابعت الزلازل بها فتهدمت أكثر دورها وسقطت من الجامع العتيق بمصر قطعه.

<287> 951-1004 •Rossano ▷landslide◁

sources Barthol. Ross. *Vita S.Nili* 2

literature Rossi (1837); Giovanelli (1966)

catalogues Capocci (1861); Mercalli (1883); Baratta (1901); Carrozzo *et al.* (1973); Guidoboni (1989)

An account of this earthquake has come down to us as an episode in the *Life of St.Nilus*, founder of the monastery of Grottaferrata, written by Bartolomeo da Rossano, a disciple of his, in the second half of the 10th century. Many historians (see Giovanelli 1966) have taken the view that Bartolomeo's narrative is a reliable source of information for the history of southern Italy in the 10th century.

His text presents the earthquake as a tremendous cataclysm. Together with a landslide which followed, it caused such havoc in the village of Rossano that the inhabitants themselves could scarcely recognise it afterwards. The village is mentioned both because of the destruction caused there and because of the miraculous events which surrounded the earthquake. Bartolomeo stresses the fact that only the cathedral church and the chapel of Santa Irene were spared, and also that none of the inhabitants or their animals were killed, this being evidence of the benevolent protection offered by the saint: "At about that time there was a terrible earthquake at Rossano, accompanied by continuous rain by night and day, with the result that there was a landslide in the lower part of the village which buried houses and churches, sparing only the cathedral and the church of Santa Irene. All those who saw how what happened changed the appearance and position of everything were struck with great amazement and terror. But it was much more amazing that in spite of the tremendous cataclysm, neither persons nor animals lost their lives".

Ἐν τῷ καιρῷ ἐκείνῳ σεισμοῦ μεγάλου καταλαβόντος τὸ Ῥουσιάνον μετὰ πολλῶν νυχθημέρων ὀμβροκλυσίαν, καὶ τοῦ ἀνωτέρου μέρους ἐπαναστάντος σὺν οἴκοις καὶ εὐκτηρίοις, καὶ ἐπελθόντος τοῦ κατωτέρου, καλύψαντός τε οἴκους καὶ ἐκκλησίας, καὶ μὴ αἰδεσθέντος εἰ μὴ μόνην τὴν καθολικὴν ἐκκλησίαν, καὶ τὸ ὄνομα τῆς ἀγίας Εἰρήνης, θαυμαστόν ἦν καὶ φοβερόν τοῖς ὁρώσι τὸ γεγονός, ἄλλα ἐξ ἄλλων φαινόμενα τὰ πάντα, καὶ ἕτερα ἀνθ' ἑτέρων. Τὸ δὲ παράδοξον, ὅτι ἐν τοιούτῳ κατακλυσμῷ φοβερῷ οὐδεμία ψυχὴ ἀνθρώπου ἢ κτῆνους ἀπώλετο.

Giovanelli (1966, p.158, note 109) is inclined to think that the earthquake was less severe than Bartolomeo suggests, and blames landscape changes on the landslide, caused by incessant rain. However, in the light of earthquake effects in the same area in more recent times (for example, the earthquake of 24 April 1836, which caused considerable landscape changes at Rossano: Rossi 1837, p.29; Baratta 1901, pp.379-80), it is quite possible that the earthquake described in the *Life of St.Nilus* did indeed produce such substantial earth movements that the landscape around Rossano became unrecognisable to its own inhabitants. Giovanelli (1966, p.158, note 109) dates the earthquake to 973-975, before the time of the incursions by Abū al-Qāsim, Emir of Palermo; but he does not make clear his reasons for doing so. We think it more appropriate to place it within a broader time scale, namely between 951-952 and 1004 — that is to say, between the time when al Hasan, Emir of Sicily, raided Calabria (Giovanelli 1966, p.148, note 79; p.151, note 87, p.154, note 99) and the date of the death of St.Nilus.

⟨288⟩ **the night of 15 September 951 ●Alexandria, ●Egypt**

sources al-Antākī, *Dhayl ta'rikh Ibn Batrīq* 113; Ibn al-Dawādārī, *Kanz al-durar* 5.323

literature Taher (1979)

catalogues Poirier and Taher (1980); Maamoun *et al.* (1984)

According to al-Antākī, an earthquake tremor caused many houses to collapse in Egypt and damaged the lighthouse at Alexandria: "There was an earthquake in Egypt on the night after 11 rabi II in the year 340 [of the Hegira = 15 September 951 A.D.]. Many buildings collapsed that night, and there were many victims. Some springs also flowed out, and the lighthouse at Alexandria split open".

وحدث بمصر زلزلة في الليلة التي صباحها الاثنين لعشر خلون من ربيع الآخر سنة اربعين وثلاثمائة وتساقطت منها عدة دور ومات منها خلق من الناس وانفجرت عيون ماء في غير موضوع وانشقت منها منارة الاسكندرية.

Ibn al-Dawādārī refers to two historical traditions which differ as to the date of an earthquake in Egypt: "In that year [338 of the Hegira = 1 July 949 – 19 June 950 A.D.] there was a strong earthquake in Egypt. People fled into the desert of their own accord. So it appears in the account by Sāhib al-Barq al-Shāmī [ʿImād al-Dīn al-Isfahānī]. According to other Egyptian historians, this terrible earthquake happened in the year 340 [of the Hegira = 9 June 951 – 28 May 952 A.D.]".

فيها كانت زلزلة عظيمة بمصر وخرج الناس على وجوههم هاربين الى الصحارى هذا ما ذكره صاحب البرق الشامي وأما غيره من جماعة أرباب التواريخ المصرية فذكروا أن الزلزلة العظيمة كانت بمصر في سنة أربعين وثلاثمائة حسبما يأتي من ذلك.

This information, however, may refer to the earthquake which al-Nuwayrī dates to 25 July 950 A.D. (see entry ⟨286⟩).

⟨289⟩ **9 June 951 – 28 May 952 ●Aleppo, ●Dulūk, ●Raʿbān, ●Tall Halid**

sources Ibn Tagrī Birdī, *al-Nujūm al-zāhira* 3.305

literature Taher (1979)

catalogues Poirier *et al.* (1980); Poirier and Taher (1980)

Ibn Tagrī Birdī describes a forty-day period of very destructive seismic activity which affected Aleppo and other places: "In that year [340 of the Hegira = 9 June 951 – 28 May 952 A.D.] there were many earthquake tremors in Aleppo and other cities. They lasted for forty days, causing many victims and destroying the strongholds of Tall

Hāmid [Tall Halid] and those of the towns of Ra'bān and Dulūk; in the walls of the latter, three towers collapsed”.

وفيهما كثرت الزلازل بحلب والعواصم ودامت أربعين يوماً وهلك خلق كثير تحت الردم وتهدم حصن رعبان ودلوك وتل حامد وسقط من سور دلوك ثلاثة أبرجة.

〈290〉 **noon on 5 January 956 • Alexandria, Egypt, Maghreb, Syria**

sources al-Mas'ūdī, *al-Tanbih* 48-9

literature Taher (1979)

catalogues Sieberg (1932 a); Poirier and Taher (1980); Maamoun *et al.* (1984)

al-Mas'ūdī says that while he was in Cairo, news arrived from Egypt, Syria and the Maghreb of a violent earthquake which had caused particular damage to the lighthouse at Alexandria: “In the month of Ramadan of the year 344 [19 December 955 – 17 January 956 A.D.] the upper part [of the lighthouse at Alexandria] collapsed from the top for about 30 cubits because of the earthquake in Egypt and in large parts of Syria and the Maghreb at the same time. I was in Cairo at the time, and according to the news there, the earthquake was a terrible disaster. It lasted for half an hour. It happened at noon on Saturday 18th of that month [5 January 956 A.D.]; which corresponds to 5 Canun II in the Syrian calendar, 9 dīmāh in the Persian calendar, and 9 tūba in the Coptic calendar”.

وتهدم في شهر رمضان سنة ٢٤٤ نحو من ثلاثين ذراعاً من أعاليها بزلزلة التي كانت ببلاد مصر وكثير من بلاد الشام والمغرب في ساعة واحدة على ما وردت به علينا الأخبار المتواترة ونحن بفسطاط مصر وكانت عظيمة جداً مهولة فظيعة أقامت نحو نصف ساعة زمانية وذلك النصف من يوم السبت لثمانى عشرة ليلة خلت من هذه الشهر وهو اليوم الخامس من كانون الآخر من شهور السريانيين واليوم التاسع من ديماء من شهور الفرس والتاسع أيضاً من طوبة من شهور القبط.

〈291〉 **12 May 963 Egypt**

sources al-Antākī, *Dhayl ta'rikh Ibn Baṭriq* 121

literature Taher (1979)

catalogues von Hoff (1840); Mallet (1853); Poirier and Taher (1980)

According to al-Antākī an earthquake struck Egypt, but no particular effects are mentioned: “During the night of 14 Rabi' II in the year 352 [of the Hegira = 12 May 963 A.D.] there was an earthquake in Egypt, accompanied by a violent storm. The next day, the sun took on a deep red colour from morning until sunset; people invoked God's mercy”.

وحدث زلزلة بمصر ودويّ عظيم ليلة أربع عشرة من ربيع الآخر سنة اثنين وخمسين وثلاثمائة وأصبحت الشمس حمرة وبعده إلى السواد فابتهل الناس إلى الله.

〈292〉 **dawn on a day in late September 967 • Claudiopolis, Constantinople, Honorias, Paphlagonia**

sources Leo Diac. 68; Scylitz. 277 = Cedren. 2.372; Zon. 2.206

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Grumel (1958); Guidoboni (1989)

Leo Diaconus, a chronicler who lived at the time of the occurrence, records a destructive earthquake at Claudiopolis: “In that same year [967 A.D.], just when the summer solstice was giving way to autumn, God shook the earth so violently that houses and cities were damaged. It was then that Claudiopolis, that lovely city in Galatia, was destroyed by an extremely violent earthquake tremor, which suddenly made it a tomb

for its inhabitants, and instantly killed many people from other places who happened to be passing that way”.

Κατὰ δὲ τὸν αὐτὸν χρόνον, ἄρτι τῆς θερινῆς τροπῆς μεταβαλλούσης ἐπὶ τὸ μετόπωρον, ἔσεισεν ὁ Θεὸς μέγα, ὥς καὶ οἰκίας καὶ ἄσθη ἀνατραπῆναι. Κλαυδιούπολιν τε, τὸ εὐδαιμονέστατον χωρίον τῶν Γαλατῶν, τότε συνέβη, κατεριπωθεῖσαν ἐκ τῆς ἀνυποστάτου κινήσεως καὶ ἐνόσεως, αἰφνίδιον τῶν οἰκητόρων τάφον γενέσθαι, καὶ πολλοὺς τῶν ἐπηλύδων παρατυχόντας ἐν ἀκαρεῖ διαφθαρήναι.

Joannes Scilitzes is more specific about the date, and reports that the earthquake struck Honorias and Paphlagonia: “On 2 September, during the twelfth hour of the night [c.5 a.m.], in the eleventh indiction, a very strong earthquake tremor struck Honorias and Paphlagonia”.

Δευτέρα δὲ Σεπτεμβρίου μηνὸς, ὥρα τῆς νυκτὸς δωδεκάτη, ἰνδικτιῶνος ἐνδεκάτης γέγονε βρασμὸς καὶ κλόνος γῆς ἐξαισίος, καὶ ἔπαθε κακῶς Ὀνωριάς καὶ Παφλαγονία.

Zonaras specifies that Constantinople was not damaged at all: “When Phocas [Nicephorus II Phocas] was emperor, there was a tremendous earthquake tremor, which caused no damage at all in the city of Constantinople, but other cities were badly damaged”.

Γέγονε δὲ τοῦ Φωκά βασιλεύοντος καὶ κλόνος τῆς γῆς φρικωδέστατος, ἐξ οὐπὲρ ἡ μὲν Κωνσταντίνου οὐ πᾶν τι πέπονθε, πόλεις δ’ ἕτεραι καὶ σφόδρα πεπόνθασιν.

Since the contemporary source refers to “the time when summer was giving way to autumn”, we have thought it appropriate to date the earthquake to the end of September.

(293) 1 July 969 •Egypt

sources al-Antākī, *Dhayl ta’riḫ Ibn Batriq* 133

literature Taher (1979)

catalogues Sieberg (1932 a); Poirier and Taher (1980)

Many people died in earthquakes which struck Egypt at the beginning of July 969, according to al-Antākī: “People woke up on Monday [12 sha’ban 358 of the Hegira = 1 July 969 A.D.; 1 July 969 was not a Monday but a Tuesday] in fear and trembling because of the earthquakes that ravaged the land. Many people died [in the disaster]”.

وأصبح الناس يوم الاثنين (ثاني عشر شعبان) من الفزع والوجل وكثرت الرجفات ونهبت البلد وقتل فيه ناس كثير.

(294) 972 •Antioch, Damascus

sources al-Antākī, *Dhayl ta’riḫ Ibn Batriq* 139; al-Maqrīzī, *Itti’āz al-hunafā’* 1.131

literature Taher (1979)

catalogues Poirier *et al.* (1980); Poirier and Taher (1980)

al-Antākī refers to the rebuilding of the walls of Antioch after they had collapsed in an earthquake: “There was an earthquake in Antioch, and a large part of its walls collapsed. The emperor [John] son of Zimisce sent Michael Burtzes with 12,000 workmen and bricklayers. The fallen walls were restored to their original form”.

حدث بانطاكية زلزلة فسقطت قطعة كبيرة من سورها وانفذ الملك يانيس بن الشمشقيق لمخائيل البرجي في اثني عشر الف بناء وفاعل وبنى ما سقط من السور وردّه الى مثل ما كان عليه.

According to al-Maqrizī the earthquake also affected Damascus: "A strong earthquake suddenly occurred in Damascus and the surrounding area. It caused many towers to collapse in Antioch".

زلزلت دمشق وأعمالها زلزلة عظيمة وقتا من الزمان وانهدم من أنطاكية عدة أبرجها.

(295) **towards dawn on 20 January 976 Monza**

sources A notula in ms 6B 45 (b18/135), f.23r

literature Bianchi (1723); Frisi (1794); Waitz (1878); Ho Peng Yoke (1962); Cappelli (1983)

catalogues Mercalli (1883); Baratta (1901); Guidoboni (1989); Alexandre (1990)

This earthquake is recorded in a *notula* to be found in f.23r of a codex of the *Historia Langobardorum* of Paul the Deacon, now in the Biblioteca Capitolare at Monza. Together with other annotations about the church at Monza, this *notula* was probably inserted into Paul the Deacon's text by the scribe, whose hand has been dated to the 11th or 12th century by Waitz (1878, p.34 and note 4), who edited the work for the *Monumenta Germaniae Historica*.

It is probable that in the text from which the scribe was working the annotation was in the margin and derived from the observations of an eye-witness of the earthquake. This is suggested by the tenor of the information provided, together with that of the annotations which precede and follow it, as well as the inclusion of a number of descriptive details.

The brief reference to the earthquake appears between a report of a comet during the reign of Otto II (August 975) and the description of an unusual celestial phenomenon (referred to as "signum in celo") which occurred on 31 October 970, during the joint reign of Otto I and Otto II (968-973).

The *notula* reads: "During the reign of the emperor Otto II, in the month of August, a comet appeared, in the third indiction. In the same year, the following happened on the thirteenth day before the Calends of February [20 January]: the moon ceased to shine for about an hour, and there was a great earthquake, towards cockcrow, in the fourth indiction".

Regnante Ottone minore Imperatore mense augusti totum apparuit stella cometis percurrente indictione .iiii. In ipso anno hoc fuit .xiii. Kl. februarii: luna amisit lumen suum quasi hora una et terremotus factus est magnus iuxta gallorum cantus pro indictione .iiii.

This is the comet recorded by certain Chinese chronicles for 3 August 975 (Ho Peng Yoke 1962, p.181). The second date must therefore refer to the eclipse of the moon and the earthquake, which the text suggests occurred together.

As for the dating system used in this source, it has to be pointed out that the writer of the *notula* seems to have been using a style which worked from the Incarnation and began the year on 25 March: that explains how the appearance of the comet and the eclipse of the moon could be placed in the same year (August and 20 January 975 in the Incarnation style, which correspond to August 975 and 20 January 976 in our present-day calendar).

The calculation of the indiction was based on a different system, however. In the Byzantine system, the indiction number changed every 1 September (we know that the Greek or Byzantine indiction system was used in the Milan area in the period with which we are concerned); and that explains how the two above-mentioned dates could respectively fall in the third (August 975) and fourth indiction (20 January 976; see Cappelli 1983, pp.6-7, 10).

〈296〉 **19 August 977 – 8 August 978 Mahdia**

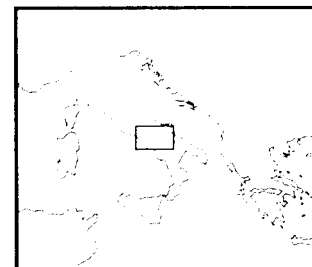
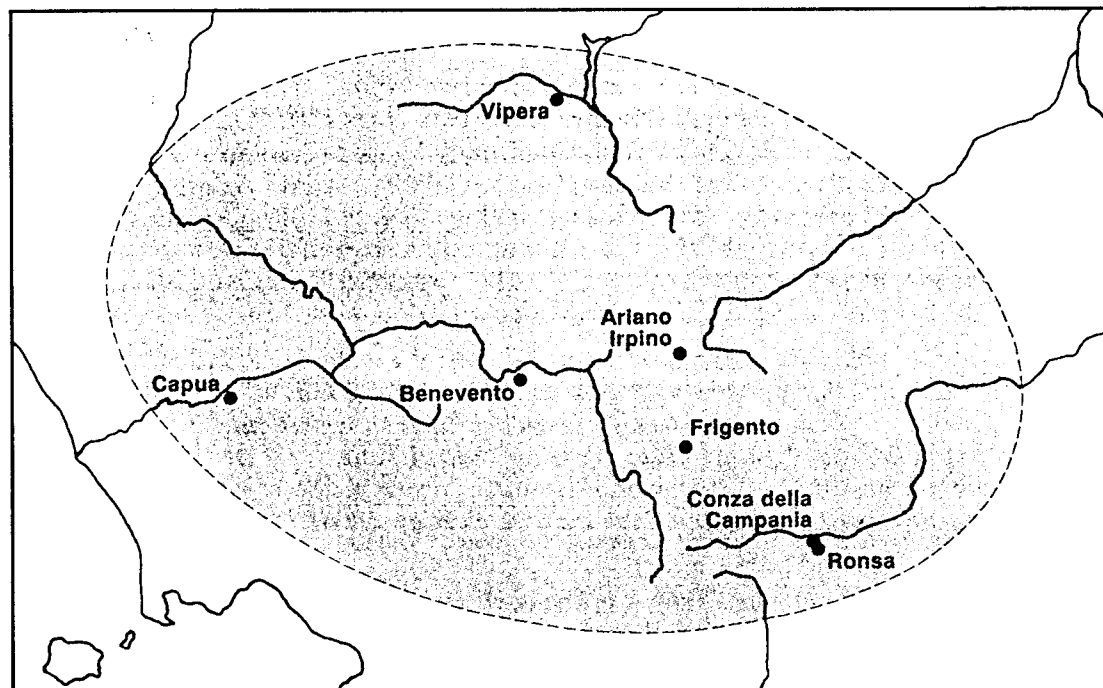
sources 1 Ibn al-Athīr, *al-Kāmil fi'l-ta'rīkh* 8.510
 sources 2 Ibn 'Adhārī, *Bayān al-mughrib* 1.247
 literature Taher (1979)
 catalogues Roux (1932); Poirier and Taher (1980)

After mentioning strange phenomena in the sky which frightened people, Ibn al-Athīr, reports a period of seismic activity which obliged the inhabitants of Mahdia in Tunisia to abandon their homes: "In that year [367 of the Hegira = 19 August 977 – 8 August 978 A.D.] the sky took on a fiery red colour between East and North like flames, and people poured into the streets invoking the name of God. There was a dreadful earthquake at Mahdia which lasted for forty days. The people of the city left their homes and properties".

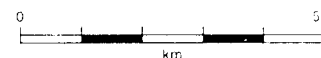
فيها ظهر بافريقية في السماء حمرة بين المشرق والشمال مثل لهب النار فخرج الناس يدعون الله تعالى ويتضرعون اليه وكان بالمهدية زلازل واهوال اقامت اربعين يوما حتى فارق أهلها منازلهم واسلموا امتعتهم.

This is probably the same earthquake as that described by Ibn al-Athīr and Ibn 'Adhārī though the latter dates the earthquake to the year 371 of the Hegira instead of 367: "In the month of Jumada I of that year [371 of the Hegira = 2 November – 1 December 981 A.D.], there were earthquakes in Mahdia for the whole of that month and the first ten days of the next [until 11 December]. The earth shook more than once each day; most of the population fled, abandoning their homes and properties.

وفي جمادى الاولى من هذه السنة كان بالمهدية زلازل دامت الشهر كله وعشرة ايام بعده
 تزلزل في كل يوم مرات حتى هرب اكثر أهلها واسلموا ديارهم وما فيها.



25 October
989/990



〈297〉 **25 October 989/990 ●Ariano Irpino, ●Benevento, ●Capua, ●Conza della Campania, ●Frigento, ●Ronsa, ●Vipera**

sources *Ann. Benevent.* 127; Leo Ost. *Chr. Mon. Casin.* 189; Romuald. *Salern. Chron.* 170-1
 literature Bertolini (1923); Pratesi (1956); Ho Peng Yoke (1962); Hoffmann (1967); *Abruzzo Molise* (1979); Chiusano (1983); Molin (1985); Bloch (1986); Maffei (1987); Valensise and Pantosti (1993)

The earliest evidence for this earthquake is to be found in the *Annales Beneventani* of the monastery of S.Sofia. They were written in three redactions at the beginning of the 12th century, and derive from earlier *Annales Beneventani*, which were probably drawn up as annotations to the chronological tables of the monastery from the early 9th century, and perhaps even in the late 8th century (Bertolini 1923, p.87).

The earthquake is reported very briefly in redaction A.1.: "In the year 990, in the third [indiction], on the eighth day before the Calends of November [25 October] there was a great earthquake at Benevento, which caused many buildings to collapse, and many people were killed".

DCCCCLXC. [indictione] III. VIII. kalendas novembris factus est terremotus magnus in Benevento, pro quo ceciderunt multa edificia, et plures homines mortui sunt.

Redaction A.2. is more detailed: "In the year 990, in the third indiction, in the eighth year of Lord Pandulf and the third year of his son Landulf. On the eighth day before the Calends of November [25 October] of that year there was an earthquake which caused fifteen towers to collapse in Benevento, and many houses at Vipera, and one hundred and fifty people died as a result".

DCCCCLXXX [indictione] III. an. VIII. domni Paldolfi et III. an. domni Landolfi filii eius. hoc anno VIII. kalendas novembris fuit terremotus unde corruerunt turres XV. in Benevento, et Vipera domus multe, et ex eo mortui sunt CL. homines.

Another important account is that of Leo Ostiensis, who probably had before him the common source of the three redactions of the *Annales Beneventani* (Bertolini 1923, pp.70-1). However, he must either have used that source to a greater extent than the others, or else he used other sources as well, because his account of the effects of the earthquake embraces a much greater area, including Capua, Ariano Irpino, Frigento, Conza della Campania and Ronsa: "Before these two years there was a great earthquake in both Capua and Benevento: it caused many houses to collapse in Capua and made the bells of the town toll of their own accord. At Benevento it destroyed Vipera and caused fifteen towers to collapse, killing one hundred and fifty people in them. It destroyed much of Ariano and Frigento. It reduced about half of Conza to ruins and killed its bishop as well as many others. It also destroyed Ronsa and all its inhabitants".

Ante hoc ferme biennium ingens terremotus factus est tam in Capua quam in Benevento, ita ut in Capua plurimas domus everteret et campanas eiusdem civitatis per se sonari faceret. In Benevento autem Viperam deiecit et subvertit quindecim turres, in quibus videlicet centum quinquaginta homines mortui sunt. De Ariano et Frecento magnam partem destruxit. Compsanam civitatem prope mediam evertit eiusque episcopum cum aliis multis occidit. Ronsam vero cum universis fere in ea manentibus summersit.

A later source containing a description of the earthquake is the *Chronicon* of Romuald of Salerno, which was compiled in the second half of the 12th century. Although it provides no further information as to where the earthquake struck, it does describe the passage of a comet which is not mentioned by the *Annales Beneventani* or Leo Ostiensis: "In the year of our Lord 990, a star appeared in the north whose bright tail stretched towards the south for almost one pace. And a few days later the same star reappeared in the west and its bright tail stretched towards the east. Soon afterwards there was a great earthquake which destroyed many houses in Benevento and killed many people in Capua, and it also destroyed many churches in the city of

would be in the fourth indiction". More recently, however, Hoffmann (1967, p.166 note 25) has rejected the arguments of Bertolini (1923) and Pratesi (1956), pointing out that: "the indictions and the years of the ruler's reign in the source are related in only a very schematic way to the year of the Incarnation, and therefore do not usually fully match up". In Hoffmann's view, therefore, it is better to follow the *Annales Beneventani* and Romuald of Salerno, who specifically date the earthquake to 990.

However, Romuald's dating is also probably more problematic than it appears. The "star" described in the *Chronicon* was probably Halley's comet. We know from Chinese sources that Halley's comet could certainly be seen at least during the period 12 August - 12 September in the year 989 (Ho Peng Yoke 1962, p.181; Maffei 1987, pp.206-9). Hence, if what Romuald reports really was Halley's comet, we must at least split the information which he brings together under the year 990; for there is no doubt at all that the sighting of the comet must have occurred in the previous year. This does not mean that the earthquake must also be dated to 989, although the temporal link between comet and earthquake as set out in the *Chronicon*, "*et non post multos*", does tend to suggest that.

If, then, we collate all the available information, we can suggest that the sequence of events may have been as follows: 12 August - 12 September 989: Halley's comet visible (Chinese sources and Romuald of Salerno); 25 October 989: earthquake in Irpinia ("*viii. kalendas novembris*" appears in both redactions of the *Annales Beneventani*).

Romuald's expression "*et non post multos*" fits the period between the first half of September, by which time Halley's comet could probably no longer be seen, and 25 October (about 6 weeks later), when the Irpinia earthquake occurred.

〈298〉 the evening of 26 October 989 •Constantinople, •Nicomedia

sources *Anonymus lament*; Leo. Diac. 175-6; al-Antākī, *Dhayl ta'rikh Ibn Batriq* 428;

Synax. Eccl. Constant. 166; Scylitz. 331-2 = Cedren. 2.438

literature Würthle (1917); Mango (1962, 1988)

catalogues Bonito (1691); von Hoff (1840); Mallet (1853); Schmidt (1881); Downey (1955); Grumel (1958); Ambraseys (1962 b); Shebalin *et al.* (1974); Comninakis and Papazachos (1982); Papazachos and Papazachos (1989); Guidoboni (1989)

Leo Diaconus describes this earthquake at Constantinople with a wealth of detail. It is famous for having damaged a large number of buildings, including the church of St.Sophia, which was later reinforced with powerful buttresses by Basil II: "When evening arrived on the day when it is customary to commemorate the great Demetrius martyr [26 October in Greece], there was an earthquake such as had never before occurred in those days. It caused the towers of Byzantium to collapse and knocked down many houses, entombing their inhabitants inside. It razed to the ground villages near Byzantium and killed a great many peasants; and it even affected the upper dome of the great church [St.Sophia] and caused the western apse to collapse; but it was later rebuilt by the emperor Basil over a period of six years".

Καὶ γὰρ ἐσπέρας ἐνισταμένης, ἐν ἣ μνήμην τοῦ μεγάλου Δημητρίου καὶ μάρτυρας τελεῖν παρέλαβεν ἡ συνήθεια, φρικώδης ἐπενηχθεὶς σεισμός, καὶ οἷος οὐκ ἄλλος κατὰ ταύτας δὴ συνέβη τὰς γενεάς, τὰ τε πυργώματα τοῦ Βυζαντίου πρὸς γῆν κατερίπωσε, καὶ τὰς πλείους ἐστίας ἀνέτρεψε, τάφον αὐτὰς τοῖς οἰκοῦσιν ἀπεργασάμενος, τὰ τε προσέγγια τοῦ Βυζαντίου χωρία μέχρις ἐδάφους κατέβαλε, καὶ πολλὴν τῶν ἀγροίκων φθόρον ἐποίησεν· οὐ μόνον δέ, ἀλλὰ καὶ τὸ ἡμισφαίριον τῆς ὑπερώας τῆς μεγάλης ἐκκλησίας σὺν τῇ πρὸς δύσιν ἀψίδι κατέβαλε καὶ εἰς γῆν κατερίπωσεν· ἄπερ αὐθις ὁ αὐτοκράτωρ Βασίλειος ἐν ἑξ ἐνιαυτοῖς ἐδομήσατο.

Joannes Scylitzes also refers to this earthquake, and dates it to October 986: "In

October of the year 6494 [October 986], in the fifteenth indiction [986/987], there was a powerful earthquake tremor and many houses and churches collapsed, as well as part of the dome of the great church of God [St.Sophia].

Ἰνδικτιῶνος δὲ πεντεκαίδεκάτης, ἔτους ἑξακισχιλιοστοῦ τετρακοσιοστοῦ ἑνενηκοστοῦ τετάρτου, ὀκτωβρίῳ μηνί, ἐγένετο κλόνος μέγας, καὶ κατέπεσον οἰκίαι πολλαὶ καὶ ναοὶ καὶ μέρος τῆς σφαίρας τῆς τοῦ Θεοῦ μεγάλης ἐκκλησίας.

The lament *Eis tēn 'Agiās Sofías súmpτωσιν*, formerly attributed to Michael Psellus (see Würthle 1917; Mango 1988), must be dated to about the year 990. There were in fact only three occasions on which the church completely collapsed: in 558, 989 and 1436. According to Mango (1962, p.77) the correct year is 989, because that is confirmed by al-Antākī. What al-Antākī actually wrote was: "In the fourteenth year of the reign of Basil [989], that is to say in the year 379 [of the Hegira = 11 April 989 – 30 March 990 A.D.], great earthquakes occurred at Constantinople, causing a third of the church of S.Sophia to collapse. At Nicomedia, many houses collapsed on top of their inhabitants. Later on, the emperor had the collapsed part of St.Sophia rebuilt. He restored the church and returned it to its original state. This was done in the eighteenth year of his reign [993 A.D.].

و في السنة الرابعة عشر من ملك باسيل و هي سنة تسع و سبعين و ثلثمائة حدث بالقسطنطينية زلازل عظيمة و وقع فيها ثلث كنيسة أجيا صوفيا وخسف بدور كثيرة في نيقوميديا على سكانها و جدد الملك في أجيا صوفيا ما سقط و رده إلى ما كان عليه في السنة الثامنة عشر من ملكه

Mango (1988, p.168) points out that, although al-Antākī dates the repairs to the church to 993 and Leo Diaconus to 995, there is no real contradiction between them, because structural repairs could have been completed in 993 and the finishing touches in 995. The colophon in Ms.B (*Laur. San Marco* 304, 10th century) of the *Etymologicum genuinum* dates the reopening of the church to 13 May 994: "[The manuscript] was completed by God's grace on Sunday, 13 May at the hour of the day when the Great Church was opened".

Ἐτελειώθη σὺν θεῷ μηνὶ μαίῳ ιγ' ἡμέρᾳ κυριακῇ ὥρᾳ τῆς ἡμέρας ὅτε ἤνυξεν [sic, but read ἤνοιξεν] μεγάλη ἐκκλησία.

(299) the night of 5 April 991 ●Ba'albek, ●Damascus

sources al-Antākī, *Dhayl ta'rikh Ibn Batrīq* 173

literature Taher (1979)

catalogues Bonito (1691); Mallet (1853); Sieberg (1932 a); Ben-Menahem (1979); Poirier and Taher (1980)

al-Antākī — an Arab historian who lived shortly after the event narrated — records a series of tremors which caused the collapse of a great many houses in Damascus and forced the population to flee into the desert: "On the night of Saturday 17 muharram in the year 381 [of the Hegira = 5 April 991 A.D.] there was an earthquake at Damascus. More than 1000 houses collapsed, and a large number of people died. That same night, a village near Ba'albek was swallowed up by the earth. Other tremors occurred in Damascus and the surrounding area and Ba'albek. The people left their houses to take refuge in the desert, where they lodged in tents. The shocks went on repeatedly till Friday 17 safar [5 May] in the same year".

وحدث بدمشق زلزلة عظيمة يوم السبت سابع عشر المحرم سنة احدى وثمانين وثلثمائة وسقط منها زهاء الف دار ومات تحت الردم خلق عظيم وخسف في تلك الليلة بقرية من قرى بعلبك وكانت الزلازل بدمشق واعمالها وبعلبك وخرج الناس من دورهم الى الصحراء والخيم وقامت الزلازل متتابعة الى يوم الجمعة السابع عشر من صفر من السنة.

〈 300 〉 995 ●Balu, ●Cop'k', ●Palnatun, ●Hašteank', ●Xorjean

sources 1 Stephen of Tarōn 3.36

sources 2 Ibn Tagrī Birdī, *al-Nujūm al-zāhira* 4.169

catalogues Abich (1882); Kostaneanc' (1902); Step'anyan (1964); Kondorskaja and Shebalin (1977); Poirier and Taher (1980); Karapetian (1991)

This earthquake struck a whole series of districts in the frontier area between present-day Armenia and Turkey. It is recorded in the seismological tradition (Abich 1882; Step'anyan 1964; Kondorskaya and Shebalin 1977; and Karapetian 1991, where two earthquakes are recorded: one in the Kars area and one at "Balu"). See also Kostaneanc' (1902, p.18).

Stephen of Tarōn records: "At that time, in the year 444 of the era of the Armenians [995 A.D.], the earth shook, particularly in the district of IV Armenia: Hašteank', Xorjean, Cop'k', Balu and Palnatun. And all the buildings collapsed at the same time".

Ի սոյն ժամանակի, ի 444 թուին շարժ եցաւ երկիր, բայց սաստագոյն Չորրորդ Հայոց, Հաշտեանք, Խորձեան, Տոփք, Պալու եւ Պաղնատուն. եւ բոլորովին փլան շինուածք ամենայն ի հիմանէ դրդղեալք.

The Arab historian Ibn Tagrī Birdī may also be referring to this earthquake, though he makes no explicit reference to any particular geographical area, when he writes: "In that year [385 of the Hegira = 4 February 995 – 21 January 996] strong earthquakes caused the world to shake; many people died in the ruins".

Terms for earthquake in ancient Mediterranean languages

Hieroglyphic		mnmn	vb.intr.: stir, shake, quake, sway; noun: earthquake, tempest
		nwr-t3	noun: 1) earthquake; 2) the god Earthquake (in the Pyramid Texts)
		sd3	vb.intr.: shudder, shiver, shake; noun: quiver
		ktkt	vb.intr.: tremble, stir, shake, quiver, sway
Hebrew	רעַרעַ רעידת אדמה	ra'as re'idat adamah	earthquake (biblical and modern Hebrew) earthquake (modern Hebrew only)
Classical Greek	σεισμός (γῆς) σύγχυσις χάσμα γῆς	seismos gēs sunchysis chasma gēs	(earth)quake ruin (earthquake) chasm in the earth
Late Antique and Middle Greek	σεισμός (γῆς) θεομηνία βρασμός (γῆς) πτώσις	seismos gēs theomēnia brasmos gēs ptōsis	(earth)quake wrath of God (earthquake) quaking (of the earth) falling, calamity (earthquake)
Classical and Middle Latin	<i>terraemotus</i> <i>terrae fremitus</i> <i>tremor (terrae)</i> <i>mugitus (terrae)</i> <i>hiatus (terrae, soli)</i>		earthquake rumbling of the earth tremor (earth)quake bellow (of the earth) cleft (in the ground)
Coptic Sahidic = S Ahmimic = A Bohairic = B	ⲕⲙⲧⲟ ⲥⲁ ⲕⲉⲙⲧⲟ ⲃ ⲙⲟⲛⲙⲉⲛ ⲃ ⲛⲟⲉⲓⲛ ⲥ ⲛⲁⲓⲛⲉ ⲁ ⲛⲟⲓⲛⲓ (ⲛⲱⲓⲛⲓ) ⲃ ⲉⲓⲛⲛⲟⲉⲓⲛ ⲥ ⲱⲟⲗⲱⲗ ⲥ ⲱⲉⲗⲱⲉⲗ ⲃ	kmto kemto monmen noein naine noini (nóini) cinnoein solsl selsel	moving of the earth, earthquake moving of the earth, earthquake shaking, earthquake, tempest shaking shaking shaking trembling, tremor shaking shaking
Ethiopic (Ge'ez)	ድለቅልቅ : ነቀለቃል : ንቅዕተ : ምድር :	delqelq naqalqál neq'ata medr	shaking, trembling, earthquake moving, shaking breaking of the earth
Syriac	ܙܐܠܐ ܢܐܘܕܐ ܢܘܕܢܐܕܐ	zaw'á nawdá nudnádá	moving, shaking, quaking, earthquake trembling, unrest, earthquake shaking, quaking of the earth
Arabic	زَلْزَلَة زَلْزَال هَزَّة أَرْضِيَّة رَجْفَة	zalzalah zilzâl o zalzâl hazzah ardiyyah rajfah	earthquake earthquake shaking of the earth earthquake
Classical and Middle Armenian	շարժում շարժ պատուհաս Տեարն Ն	šaržum šarž patuhas tearn	(earth)quake (earth)quake punishment of God (earthquake)

Short Catalogue and assessment of intensity

comparison of EMS and MSK macroseismic scales	date	major effects zone	I EMS	I MSK	places	states
<001>	760-750 c. B.C.	Jerusalem			1	IL
<002>	550 c. B.C.	Sparta	X	X	1	GR
<003>	550 c. B.C.	Syros (the island of)			1	GR
<004>	490 c. B.C.	Delos (the island of)			1	GR
<005>	490 [489/488] B.C., January-March	Aegina (the island of)			1	GR
<006>	480 B.C., September 29	Salamis			1	GR
<007>	479 B.C.	Potidaea			1	GR
<008>	469-464 B.C.	Sparta	IX-X	IX-X	1	GR
<009>	461 c. B.C.	Rome?	V-VI	V-VI	1	I
<010>	436 c. B.C.	central Italy?	VII-VIII	VII-VIII		I
<011>	431 c. B.C.	Delos (the island of)			1	GR
<012>	427-426 B.C., autumn-winter	Orchomenus			2	GR
<013>	427 B.C., December	Perinthus			1	GR
<014>	426 B.C., summer	Lamia, Phalara, Scarphe	X	X	21	GR
<015>	426-425 B.C., winter	Catania			1	I
<016>	424 B.C., March	Athens?			1	GR
<017>	420 B.C., summer	Athens, Corinth			2	GR
<018>	414 B.C., spring	Cleonae			1	GR
<019>	413-412 B.C., winter	Sparta			1	GR
<020>	412-411 B.C., winter	Cos (the island of)	≥IX ≤XI	≥IX ≤XI	1	GR
<021>	403-401 [400] B.C.	Elis				GR
<022>	388 B.C.	Argos			2	GR
<023>	373 c. B.C.	Delos (the island of)			1	GR
<024>	373 B.C., winter	Helice, Bura	X	X	2	GR
<025>	360 c. B.C.	Vulcano (the island of)			1	I
<026>	360 c. B.C.	Ophryneum	≥VIII ≤X	≥VIII ≤X	2	TR
<027>	347/346 c. B.C.	Delphi	V	V	1	GR
<028>	325-300 B.C.	Apamea			1	TR
<029>	322 c. B.C.	Phlegrean Plain				I
<030>	322 c. B.C.	Liguria				F, I
<031>	304/303 B.C., autumn-winter	Ionia				TR
<032>	287 B.C.	Lysimachia	≥IX ≤XI	≥IX ≤XI	1	TR
<033>	279 B.C., autumn-winter	Delphi			1	GR
<034>	268 B.C.	Picenum			1	I
<035>	228-224 c. B.C.	Cytinium	≥VIII ≤X	≥VIII ≤X	1	GR
<036>	227 c. B.C.	Rhodes	≥IX ≤XI	≥IX ≤XI	3	GR, TR
<037>	217 B.C., June	Cisalpine Gaul, Liguria	≥IX ≤XI	≥IX ≤XI		I
<038>	217 B.C., June	Lake Trasimeno	≥IX ≤XI	≥IX ≤XI	1	I
<039>	199-198 B.C.	Sidon	X	X	1	RL
<040>	199-198 [260] B.C.	Chalcis			1	GR
<041>	199-198 B.C.	Iasus, Panamara, Rhodes	≥IX ≤XI	≥IX ≤XI	8	GR, TR
<042>	193 B.C., March 15	Italy				I
<043>	192 B.C.	Rome	V	V	1	I
<044>	179 B.C., September	Rome	V	V	1	I
<045>	174 B.C.	Sabina	≥VIII ≤X	≥VIII ≤X	1	I
<046>	148 [130] B.C., February 21	Antioch	≥IX ≤XI	≥IX ≤XI	1	TR
<047>	133 B.C.	Luna			1	I

<048>	126 B.C.	Mt. Etna			1	I
<049>	118 B.C.	Rome?			1	I
<050>	117/113 B.C.	Apulia			1	I
<051>	100 B.C.	Picenum	VIII-IX	VIII-IX	1	I
<052>	99 B.C.	Nursia	≥VIII ≤X	≥VIII ≤X	2	I
<053>	97 B.C.	Pisaurum	III-IV	III-IV	1	I
<054>	92 B.C.	Faesulae	III-IV	III-IV	1	I
<055>	91 c. B.C.	Reggio Calabria?			1	I
<056>	91 B.C.	Modena, Reggio Emilia	≥IX ≤XI	≥IX ≤XI	3	I
<057>	88 c. B.C.	Apamea	≥IX ≤XI	≥IX ≤XI	1	TR
<058>	83 B.C.	Rome	VII-VIII	VII-VIII	1	I
<059>	76 B.C.	Reate	≥VIII ≤X	≥VIII ≤X	1	I
<060>	72-70 B.C.	Rome	VIII	VIII	1	I
<061>	65 c. B.C.	Antioch, Sirya	≥IX ≤XI	≥IX ≤XI	1	TR, SYR
<062>	63 B.C.	Panticapaeum	proved not to have taken place			
<063>	63 B.C.	Spoletium	VII-VIII	VII-VIII	1	I
<064>	58 B.C.	Dyrrachium			1	AL
<065>	56 B.C., April-May	Potentia			1	I
<066>	50 c. B.C.	Delos (the island of)			1	GR
<067>	49 B.C.	Rome?			1	I
<068>	47 B.C.	Rome?	V	V	1	I
<069>	44 B.C.	Alps?				I?
<070>	43 B.C.	Rome?	V	V	1	I
<071>	31 B.C., spring	Diospolis			1	IL
<072>	27 c. B.C.	Laodicea (Phrygia), Tralles	≥IX ≤XI	≥IX ≤XI	5	TR
<073>	17 B.C.	Apennines				I
<074>	17 B.C.	Paphos			1	CY
<075>	2 c. B.C.	Naples	VIII	VIII	1	I
<076>	5 A.D.	Rome	V	V	1	I
<077>	15	Rome	VII-VIII	VII-VIII	1	I
<078>	17 c.	Reggio Calabria, Sicily	VII-VIII	VII-VIII	1	I
<079>	17	Magnesia, Sardis	X	X	13	TR
<080>	23 c.	Cibyra	≥VIII ≤X	≥VIII ≤X	1	TR
<081>	23	Aegium	≥VIII ≤X	≥VIII ≤X	2	GR
<082>	29, November 24	Nicea	≥IX ≤XI	≥IX ≤XI	1	TR
<083>	37, March 16	Capri	VII	VII	1	I
<084>	37, March 23	Antioch, Daphne	≥VIII ≤X	≥VIII ≤X	2	TR
<085>	47 c.	Antioch	≥VIII ≤X	≥VIII ≤X	1	TR
<086>	47 c.	Samos, Smyrna	≥VIII ≤X	≥VIII ≤X	8	GR, TR
<087>	50 c.	Philippi			1	GR
<088>	50 c.	Hellespont				TR
<089>	51	Rome	VIII	VIII	1	I
<090>	53	Apamea	≥VIII ≤X	≥VIII ≤X	1	TR
<091>	53 [62/66]	Cnossus, Crete	≥VIII ≤X	≥VIII ≤X	2	GR
<092>	60	Hierapolis, Laodicea (Phrygia)	≥IX ≤XI	≥IX ≤XI	3	TR
<093>	61	Achaia				GR
<094>	61	Macedonia				GR
<095>	62, February 5	Pompei	IX	IX	4	I
<096>	64	Naples			1	I
<097>	68	Myra			2	TR
<098>	68, June	Rome	V	V	2	I
<099>	69	Nicomedia	≥VIII ≤X	≥VIII ≤X	1	TR
<100>	69-79, June 20	Corinth	≥VIII ≤X	≥VIII ≤X	1	GR

<101>	77	Cyprus	≥VIII ≤X	≥VIII ≤X		CY
<102>	79, August 24-26	Pompeii			9	I
<103>	97	Anazarbus	≥VIII ≤X	≥VIII ≤X	2	CY
<104>	100 c.	Pescolaro	≥VIII ≤X	≥VIII ≤X	1	I
<105>	101-200	Aunobaris	≥VIII ≤X	≥VIII ≤X	1	TN
<106>	101-200	Interpromium	≥VIII ≤X	≥VIII ≤X	1	I
<107>	105	Cyme, Myrina	≥IX ≤XI	≥IX ≤XI	4	TR
<108>	105	Opus, Oreus	≥IX ≤XI	≥IX ≤XI	2	GR
<109>	110	Galatia	≥IX ≤XI	≥IX ≤XI	1	TR
<110>	115, December 13	Antioch	≥IX ≤XI	≥IX ≤XI	1	TR
<111>	117-138	Italy				I
<112>	120/128	Nicomedia	≥IX ≤XI	≥IX ≤XI	4	TR
<113>	127-130 c.	Caesarea	IX-X	IX-X	2	TR
<114>	142/144	Rhodes (the island of), Myra			6	GR, TR
<115>	160, October	Dura Europos			1	SYR
<116>	160/161 c.	Mytilene	≥IX ≤XI	≥IX ≤XI	5	GR
<117>	178 c.	Smyrna	≥IX ≤XI	≥IX ≤XI	2	TR
<118>	181 c., May 3	Nicomedia	≥VIII ≤X	≥VIII ≤X	2	TR
<119>	191/192	Rome	IV	IV	1	I
<120>	201-300	Hierapolis, Laodicea (Phrygia)	≥VIII ≤X	≥VIII ≤X	2	TR
<121>	217	Rome?	V	V	1	I
<122>	223, September 9 - October 19	Rome	V	V	1	I
<123>	235-236	Amasia, Cappadocia	≥VIII ≤X	≥VIII ≤X	1	TR
<124>	241	Aphrodisias	≥VIII ≤X	≥VIII ≤X	1	TR
<125>	251-300 c.	Palmyra	proved not to have taken place			
<126>	262	Asia Minor				TR
<127>	262	Rome			1	I
<128>	262	Libya				LAR
<129>	267	Ad Maiores	VII-VIII	VII-VIII	1	DZ
<130>	268-270	Nicomedia			1	TR
<131>	275-276	Rome?			1	I
<132>	293-306	Salamis (Cyprus)	≥IX ≤XI	≥IX ≤XI	1	CY
<133>	301-400	Corycus	≥VIII ≤X	≥VIII ≤X	1	TR
<134>	303/304	Sidon	≥IX ≤XI	≥IX ≤XI	2	RL
<135>	320	Alexandria	≥IX ≤XI	≥IX ≤XI	1	ET
<136>	332	Salamis (Cyprus)	≥IX ≤XI	≥IX ≤XI	1	CY
<137>	334-335	Cos (the island of)	≥VIII ≤X	≥VIII ≤X	1	GR
<138>	341	Antioch			1	TR
<139>	341	Maximianopolis	≥VIII ≤X	≥VIII ≤X	1	TR
<140>	342	Salamis	≥IX ≤XI	≥IX ≤XI	1	CY
<141>	343	Neocaesarea	≥IX ≤XI	≥IX ≤XI	1	TR
<142>	344	Rhodes (the island of)	≥IX ≤XI	≥IX ≤XI	1	GR
<143>	346	Dyrrachium	≥IX ≤XI	≥IX ≤XI	1	AL
<144>	346	Isernia, Telesia	VIII	VIII	5	I
<145>	348/349	Berytus	VIII-IX	VIII-IX	1	RL
<146>	351-400	Hierapolis	≥VIII ≤X	≥VIII ≤X	1	TR
<147>	358, August 24	Nicomedia	IX-X	IX-X	1	TR
<148>	361-363, June	Libya	≥IX ≤XI	≥IX ≤XI		LAR
<149>	361-363, June	Sicily	≥IX ≤XI	≥IX ≤XI		I
<150>	361-363, June	Greece	≥IX ≤XI	≥IX ≤XI	4	GR
<151>	362, December 2	Nicea	VIII-IX	VIII-IX	2	TR
<152>	363, February	Constantinople			1	TR
<153>	363, May 18-19	Jerusalem, Sebastia, Nicopolis	X	X	23	IL

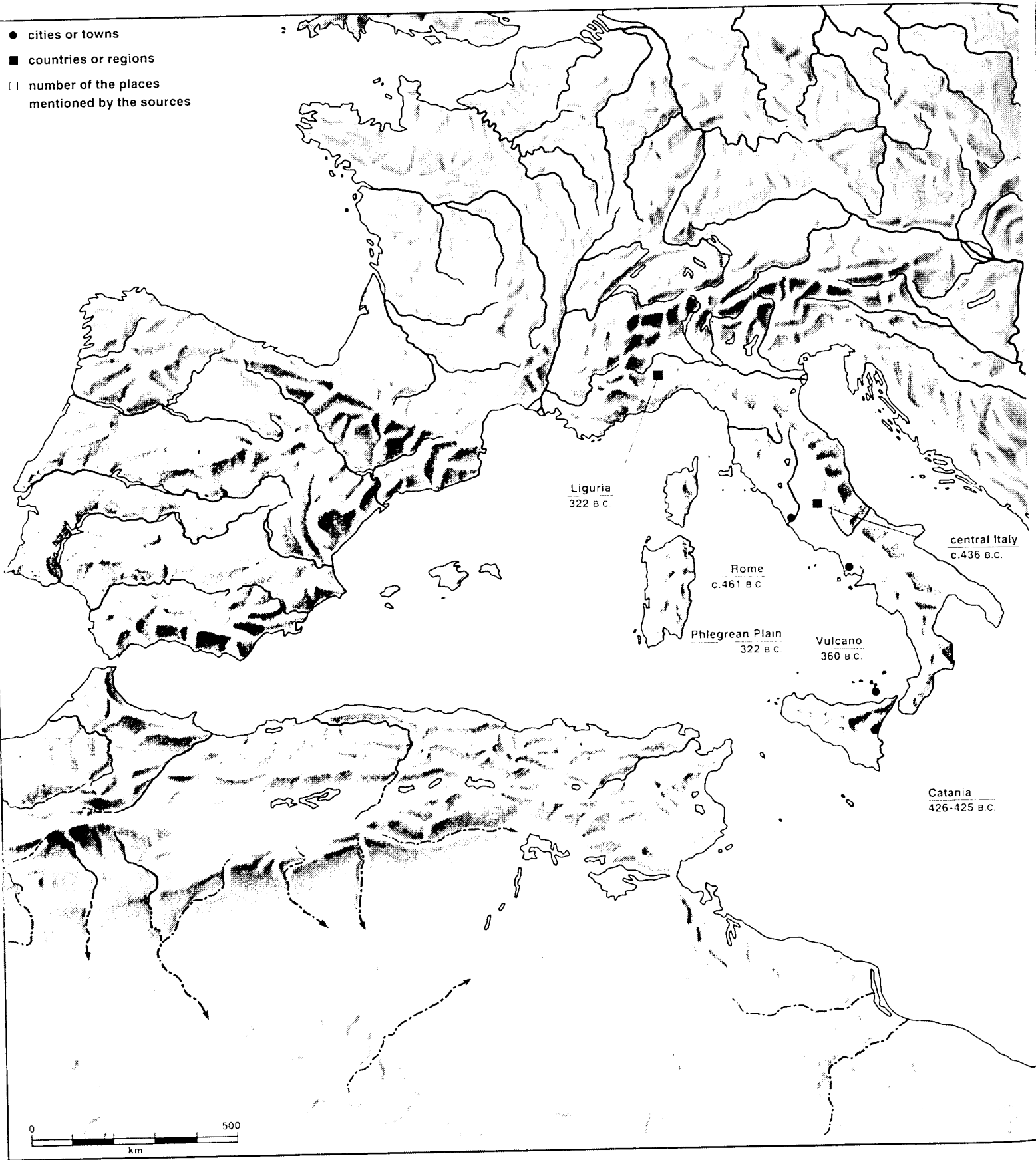
(154)	365, July 21	Crete	X-XI	X-XI	6	GR
(155)	368, October 11	Nicea	≥IX ≤XI	≥IX ≤XI	1	TR
(156)	368/369	Germe	≥IX ≤XI	≥IX ≤XI	1	TR
(157)	370 c.	Paphos	≥IX ≤XI	≥IX ≤XI	1	CY
(158)	374 c.	Reggio Calabria	≥VIII ≤X	≥VIII ≤X	1	I
(159)	375 c.	Benevento			1	I
(160)	394, September-November	Constantinople?			1	TR
(161)	396	Constantinople			1	TR
(162)	400 c.	Cirene, Hydrax	≥VIII ≤X	≥VIII ≤X	2	LAR
(163)	402	Constantinople			1	TR
(164)	403	Constantinople	V	V	1	TR
(165)	407, April 1	Constantinople	VII-VIII	VII-VIII	1	TR
(166)	408	Rome			1	I
(167)	408-450	Gortyna	≥VIII ≤X	≥VIII ≤X	1	GR
(168)	409, July 5	Constantinople			1	TR
(169)	417	Cibyra	≥IX ≤XI	≥IX ≤XI	1	TR
(170)	417, April 20	Constantinople?			1	TR
(171)	419	Palestine	≥IX ≤XI	≥IX ≤XI	1	IL
(172)	419	Sitifis	V-VI	V-VI	1	DZ
(173)	422	Constantinople?			1	TR
(174)	423, April 7	Constantinople?			1	TR
(175)	429, August 25	Ravenna			1	I
(176)	437, September 25	Constantinople	V-VI	V-VI	1	TR
(177)	442, April 17	Constantinople?			1	TR
(178)	443	Rome	≥VIII ≤X	≥VIII ≤X	1	I
(179)	443, April 15	Ravenna			1	I
(180)	447, January 26	Constantinople, Nicomedia	≥IX ≤XI	≥IX ≤XI	2	TR
(181)	450-457, September	Tripolis	≥VIII ≤X	≥VIII ≤X	1	RL
(182)	451, April	Galiccia				E
(183)	458, September 13-14	Antioch	VIII-IX	VIII-IX	1	TR
(184)	460	Cnidus, Cyzicus	VIII-IX	VIII-IX	3	TR
(185)	467	Ravenna	V	V	1	I
(186)	472	Asia Minor	≥IX ≤XI	≥IX ≤XI		TR
(187)	474-478	Rodhes	≥VIII ≤X	≥VIII ≤X	1	GR
(188)	475, September	Gabala	≥VIII ≤X	≥VIII ≤X	1	SYR
(189)	477/480, September 24/25/26	Abydus, Gallipoli, Constantinople	IX	IX	8	TR
(190)	484 [508] c.	Rome	VII	VII	1	I
(191)	492, May 26	Ravenna?			1	I
(192)	494	Hierapolis, Laodicea, Tripolis	≥IX ≤XI	≥IX ≤XI	4	TR
(193)	499, September	Nicopolis	IX-X	IX-X	3	TR
(194)	501-525	Faenza	VI-VII	VI-VII	1	I
(195)	501, October 9	Ravenna?			1	I
(196)	502, April 14	Ravenna?	X	X	1	I
(197)	502, August 22	Ptolemais	X	X	4	RL
(198)	515	Rhodes (the island of)	≥VIII ≤X	≥VIII ≤X	1	GR
(199)	518	Scupus	X	X	2	YU
(200)	521/522	Dyrrachium	≥VIII ≤X	≥VIII ≤X	1	AL
(201)	521/522	Corinth	≥VIII ≤X	≥VIII ≤X	1	GR
(202)	523-525	Anazarbus	≥IX ≤XI	≥IX ≤XI	1	TR
(203)	526, May 20/29	Antioch	X	X	2	TR
(204)	526-527	Constantinople	proved not to have taken place			
(205)	527	Pompeiiopolis	IX	IX	2	YU
(206)	528, November 29	Laodicea	IX	IX	2	TR, SYR

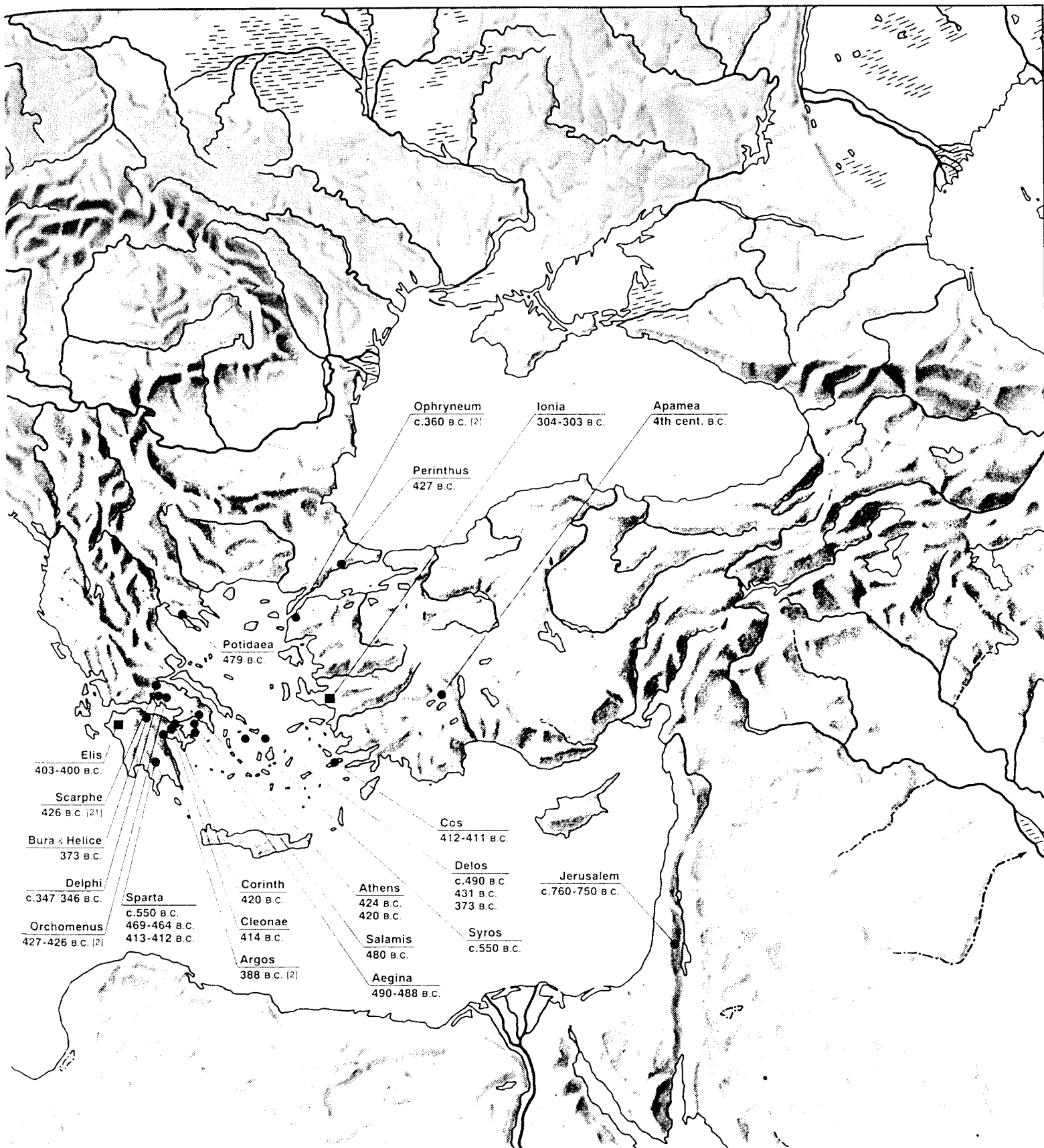
<207>	529, July	Amasia	≥VIII	≥VIII	4	TR
<208>	530	Myra	≥VIII	≥VIII	1	TR
<209>	532	Antioch			1	TR
<210>	533, November	Constantinople	V-VI	V-VI	1	TR
<211>	542, August 16	Constantinople	≥VIII	≥VIII	1	TR
<212>	543	Corinth	≥VIII ≤X	≥VIII ≤X	1	GR
<213>	543, September 6	Cyzicus	IX	IX	1	TR
<214>	544/545	Dionysopolis, Odessus			3	BG
<215>	546, April 8	Constantinople	≥VIII ≤X	≥VIII ≤X	1	TR
<216>	548, February	Constantinople			1	TR
<217>	551	Chaeronea, Naupactus, Patras	X	X	6	GR
<218>	551, July 9	Byblus, Beritus, Tripolis	X	X	7	RL
<219>	554, August 15	Constantinople, Nicomedia	VIII-IX	VIII-IX	3	TR
<220>	554, October 14	Egypt	≥IX ≤XI	≥IX ≤XI	1	ET
<221>	554-558	Cos (the island of)	IX-X	IX-X	1	GR
<222>	555, July 11	Constantinople			1	TR
<223>	557, April 16	Constantinople?	V	V	1	TR
<224>	557, October 19	Constantinople?			1	TR
<225>	557, December 14/23	Constantinople, Rhegium	IX-X	IX-X	4	TR
<226>	570 c.	Antioch	≥IX ≤XI	≥IX ≤XI	5	TR
<227>	580/581	Antioch, Daphne	IX	IX	2	TR
<228>	583, May 10	Constantinople			1	TR
<229>	584/585	Arabissus	IX-X	IX-X	1	TR
<230>	587/588, October	Antioch	VIII-IX	VIII-IX	1	TR
<231>	601 c.	Hierapolis	≥VIII ≤X	≥VIII ≤X	1	TR
<232>	601-602	Cilicia, Syria	≥IX ≤XI	≥IX ≤XI		TR, SYR
<233>	602-603	Surb Karapet	VIII	VIII	1	TR
<234>	611, April 20	Constantinople	V	V	1	TR
<235>	618, August 6	Rome	V	V	1	I
<236>	634, September	Jerusalem	≥VIII ≤X	≥VIII ≤X	1	IL
<237>	634	Aleppo	VII-VIII	VII-VIII	1	SYR
<238>	641-668	Byzantine area	≥VIII ≤X	≥VIII ≤X		
<239>	651-700	Sicily				I
<240>	659, June	Palestine, Syria	≥VIII ≤X	≥VIII ≤X		IL, SYR
<241>	659, September - 660, August	Jericho	IX	IX	1	JOR
<242>	679, April 3	Batnan	≥IX ≤XI	≥IX ≤XI	2	TR
<243>	713, February 28/March 10	Antioch, Aleppo, Qenneshrin	≥VIII ≤X	≥VIII ≤X	3	TR, SYR
<244>	717, December 24	Mesopotamia, Syria				SYR
<245>	725-744 c.	Ravenna, Classe	VII-VIII	VII-VIII	2	I
<246>	735	Vayoc' Jor	X	X		SU
<247>	740, October 26	Constantinople, Nicea, Nicomedia	≥IX ≤XI	≥IX ≤XI	4	TR
<248>	743/744	Derbend				SU
<249>	749, January 18	Jerusalem, Mabbug	IX-X	IX-X	12	IL, SYR
<250>	757, March 9	Mesopotamia	IX	IX	1	SYR
<251>	778	Treviso	VIII-IX	VIII-IX	1	I
<252>	780-797, March 17	Constantinople			1	TR
<253>	790, February 9	Constantinople	V	V	1	TR
<254>	796, March 16 - 797, March 4	Alexandria	VI-VII	VI-VII	1	ET
<255>	796, April	Crete				GR
<256>	796, May 4	Constantinople	VII-VIII	VII-VIII	1	TR
<257>	801, April 29	Rome			2	I
<258>	813-820	Byzantine area				
<259>	824	Panion	VIII	VIII	1	TR

(260)	829-842	Byzantine area					
(261)	835, January 5 - December 25	Antioch	≥ IX ≤ XI	≥ IX ≤ XI	1	TR	
(262)	836, December 30	Pavia			1	I	
(263)	847, April 10 - August 31	Rome			1	I	
(264)	847, November 24	Antioch, Damascus	≥ IX ≤ XI	≥ IX ≤ XI	7	TR, SYR	
(265)	848, June	Isernia	≥ IX ≤ XI	≥ IX ≤ XI	6	I	
(266)	849-851	Constantinople	V	V	1	TR	
(267)	853, June 12 - 854, June 1	Tiberias	≥ VIII ≤ X	≥ VIII ≤ X	1	IL	
(268)	853, August 31	Sicily				I	
(269)	857, April 1-29	Cairo	≥ VIII ≤ X	≥ VIII ≤ X	1	ET	
(270)	859, April 8 - 860, March 27	Maghreb	≥ VIII ≤ X	≥ VIII ≤ X		MA, DZ	
(271)	859, December 30 - 860, January 29	Laodicea, Antioch	IX-X	IX-X	12	TR, SYR	
(272)	862, May 28	Constantinople	VIII	VIII	1	TR	
(273)	863, February 13	Dvin	≥ IX ≤ XI	≥ IX ≤ XI	1	SU	
(274)	869, January 9	Constantinople	≥ VIII ≤ X	≥ VIII ≤ X	1	TR	
(275)	881, May 16	Tang'a, Tilimsan			2	MA	
(276)	885, November 13 - December 11	Cairo	VIII-IX	VIII-IX	1	ET	
(277)	893, December 27	Dvin	X	X	1	SU	
(278)	894	Apulia, Samnium				I	
(279)	906 c.	K'argop'	≥ VIII ≤ X	≥ VIII ≤ X	1	SU	
(280)	911, August 29 - 912, August 17	Kairouan			2	TN	
(281)	911, August 29 - 912, August 17	Egypt	≥ VIII ≤ X	≥ VIII ≤ X		ET	
(282)	926/927	Trace	≥ VIII ≤ X	≥ VIII ≤ X		BG	
(283)	935, October 4	Egypt	≥ VIII ≤ X	≥ VIII ≤ X		ET	
(284)	944, July 2-3	Cordoba	VII	VII	1	E	
(285)	945	Constantinople			1	TR	
(286)	950, July 25	Cairo	≥ VIII ≤ X	≥ VIII ≤ X	1	ET	
(287)	951-1004	Rossano	IX	IX	1	I	
(288)	951, September 15	Alexandria	≥ VIII ≤ X	≥ VIII ≤ X	1	ET	
(289)	951, June 9 - 952, May 28	Aleppo	≥ VIII ≤ X	≥ VIII ≤ X	4	SYR, TR	
(290)	956, January 5	Alexandria			1	ET	
(291)	963, May 12	Egypt				ET	
(292)	967, September	Claudiopolis	≥ IX ≤ XI	≥ IX ≤ XI	3	TR	
(293)	969, July 1	Egypt	≥ VIII ≤ X	≥ VIII ≤ X		ET	
(294)	972	Antioch	VII-VIII	VII-VIII	2	TR, SYR	
(295)	976, January 20	Monza	V	V	1	I	
(296)	977, August 19 - 978, August 8	Mahdia			1	TN	
(297)	989/990, October 25	Ariano Irpino	IX-X	IX-X	7	I	
(298)	989, October 26	Constantinople, Nicomedia	VIII	VIII	2	TR	
(299)	991, April 5	Damascus	IX	IX	2	SYR	
(300)	995	Balu, Cop'k', Palnatun	≥ IX ≤ XI	≥ IX ≤ XI	3	TR	

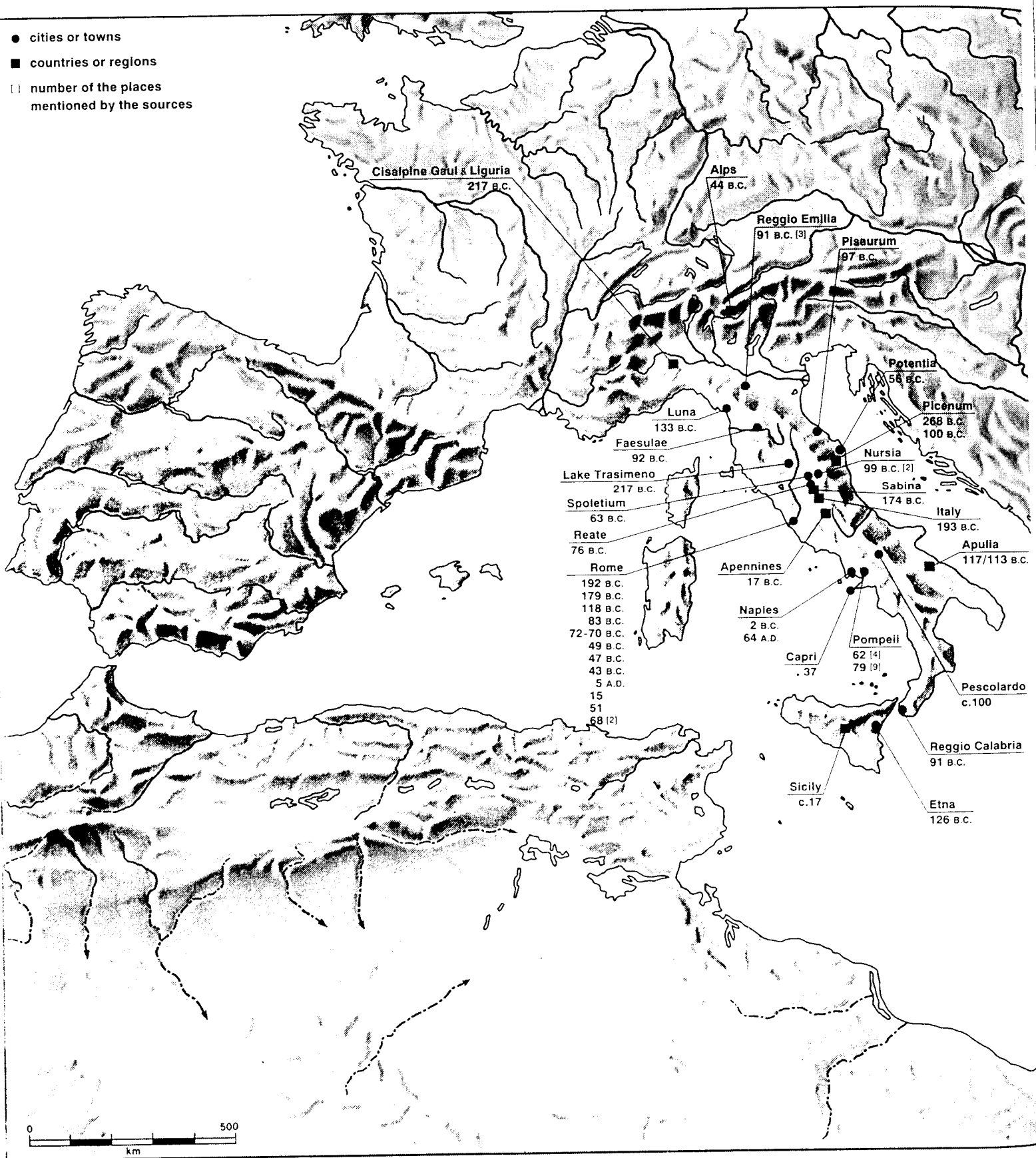
<260>	829-842	Byzantine area					
<261>	835, January 5 - December 25	Antioch	≥IX ≤XI	≥IX ≤XI	1	TR	
<262>	836, December 30	Pavia			1	I	
<263>	847, April 10 - August 31	Rome			1	I	
<264>	847, November 24	Antioch, Damascus	≥IX ≤XI	≥IX ≤XI	7	TR, SYR	
<265>	848, June	Isernia	≥IX ≤XI	≥IX ≤XI	6	I	
<266>	849-851	Constantinople	V	V	1	TR	
<267>	853, June 12 - 854, June 1	Tiberias	≥VIII ≤X	≥VIII ≤X	1	IL	
<268>	853, August 31	Sicily				I	
<269>	857, April 1-29	Cairo	≥VIII ≤X	≥VIII ≤X	1	ET	
<270>	859, April 8 - 860, March 27	Maghreb	≥VIII ≤X	≥VIII ≤X		MA, DZ	
<271>	859, December 30 - 860, January 29	Laodicea, Antioch	IX-X	IX-X	12	TR, SYR	
<272>	862, May 28	Constantinople	VIII	VIII	1	TR	
<273>	863, February 13	Dvin	≥IX ≤XI	≥IX ≤XI	1	SU	
<274>	869, January 9	Constantinople	≥VIII ≤X	≥VIII ≤X	1	TR	
<275>	881, May 16	Tangá, Tilimsán			2	MA	
<276>	885, November 13 - December 11	Cairo	VIII-IX	VIII-IX	1	ET	
<277>	893, December 27	Dvin	X	X	1	SU	
<278>	894	Apulia, Samnium				I	
<279>	906 c.	K'argop'	≥VIII ≤X	≥VIII ≤X	1	SU	
<280>	911, August 29 - 912, August 17	Kairouan			2	TN	
<281>	911, August 29 - 912, August 17	Egypt	≥VIII ≤X	≥VIII ≤X		ET	
<282>	926/927	Trace	≥VIII ≤X	≥VIII ≤X		BG	
<283>	935, October 4	Egypt	≥VIII ≤X	≥VIII ≤X		ET	
<284>	944, July 2-3	Cordoba	VII	VII	1	E	
<285>	945	Constantinople			1	TR	
<286>	950, July 25	Cairo	≥VIII ≤X	≥VIII ≤X	1	ET	
<287>	951-1004	Rossano	IX	IX	1	I	
<288>	951, September 15	Alexandria	≥VIII ≤X	≥VIII ≤X	1	ET	
<289>	951, June 9 - 952, May 28	Aleppo	≥VIII ≤X	≥VIII ≤X	4	SYR, TR	
<290>	956, January 5	Alexandria			1	ET	
<291>	963, May 12	Egypt				ET	
<292>	967, September	Claudiopolis	≥IX ≤XI	≥IX ≤XI	3	TR	
<293>	969, July 1	Egypt	≥VIII ≤X	≥VIII ≤X		ET	
<294>	972	Antioch	VII-VIII	VII-VIII	2	TR, SYR	
<295>	976, January 20	Monza	V	V	1	I	
<296>	977, August 19 - 978, August 8	Mahdia			1	TN	
<297>	989/990, October 25	Ariano Irpino	IX-X	IX-X	7	I	
<298>	989, October 26	Constantinople, Nicomedia	VIII	VIII	2	TR	
<299>	991, April 5	Damascus	IX	IX	2	SYR	
<300>	995	Balu, Cop'k', Palnatun	≥IX ≤XI	≥IX ≤XI	3	TR	

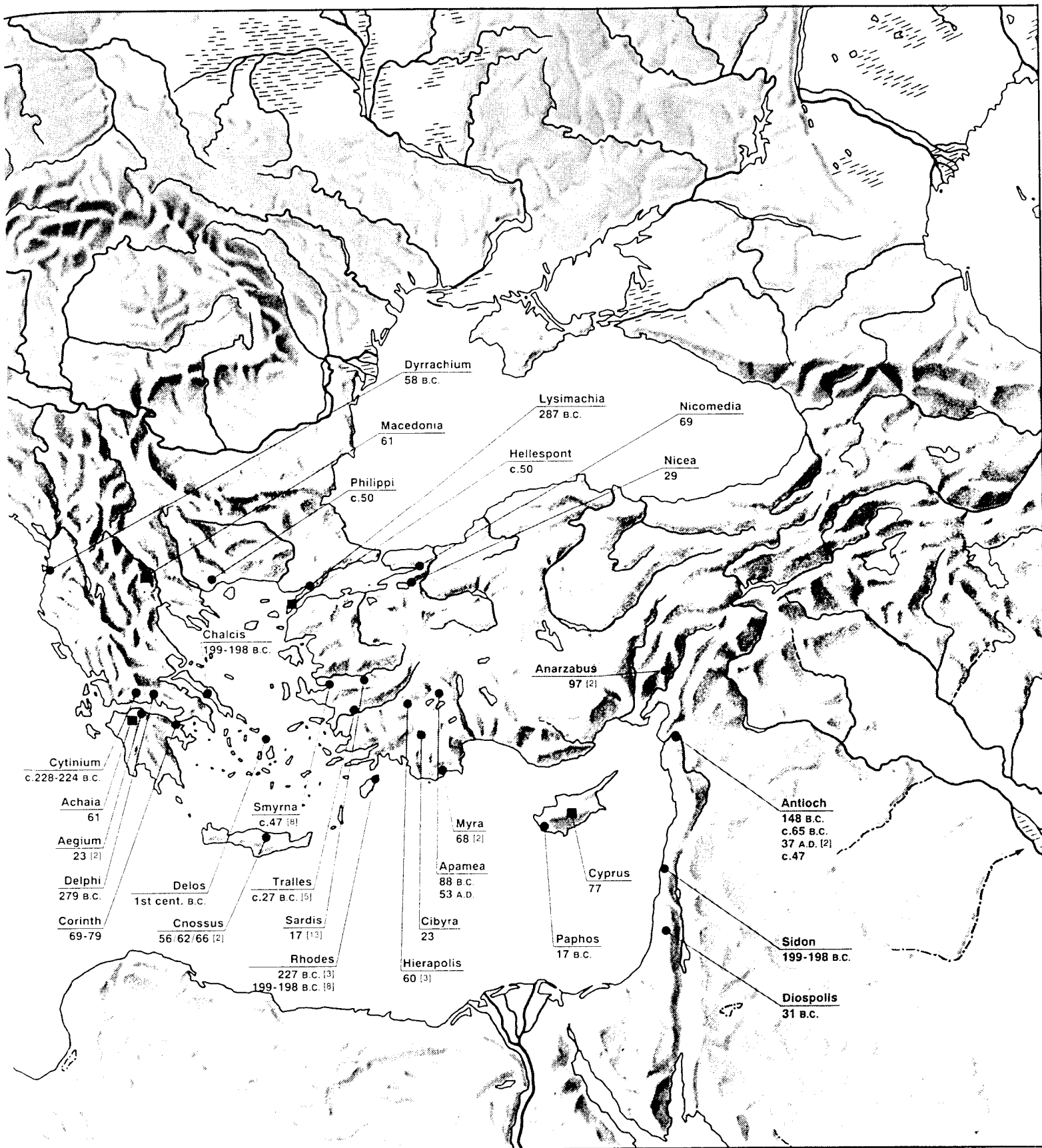
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- countries or regions
- [] number of the places mentioned by the sources





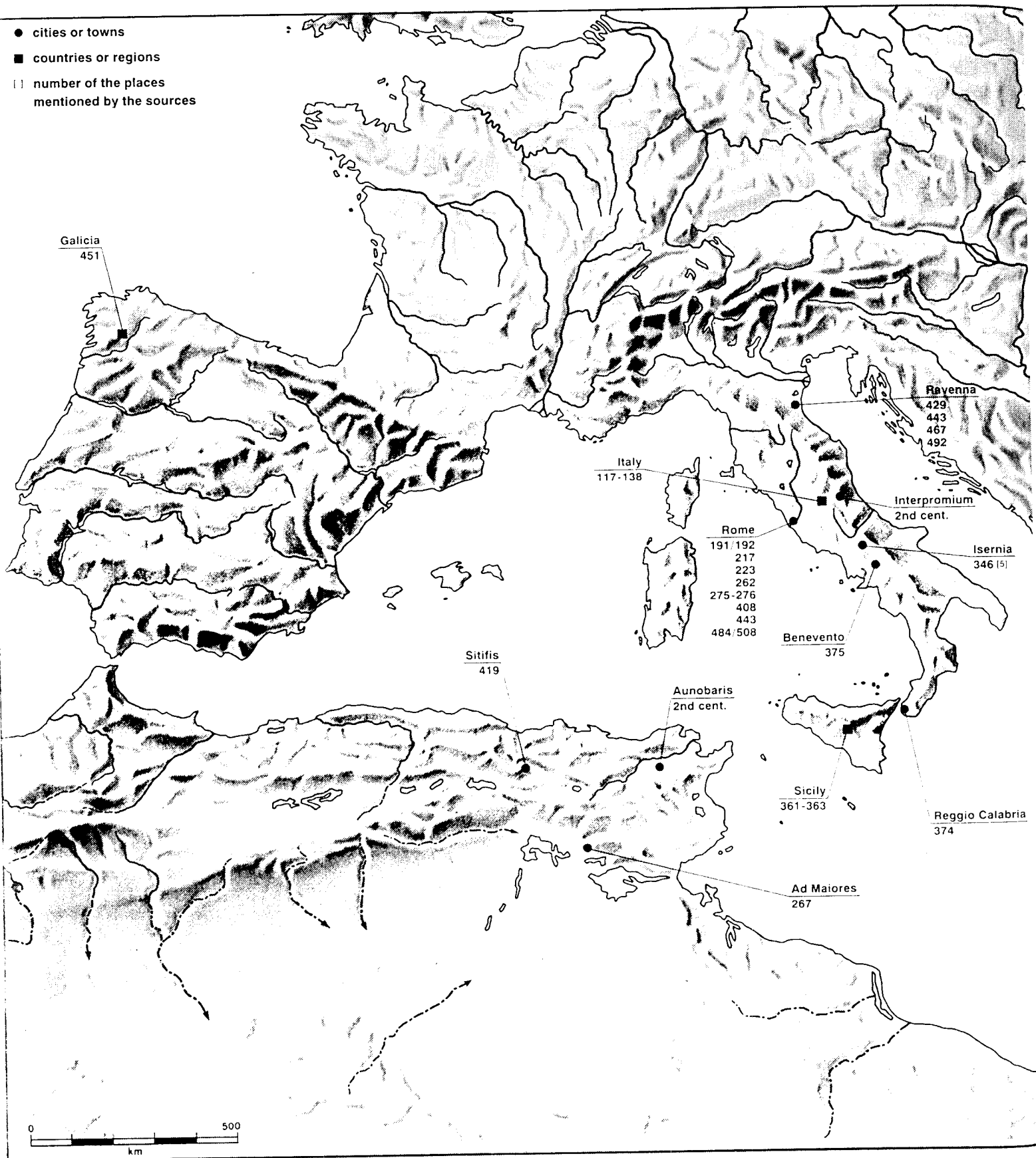
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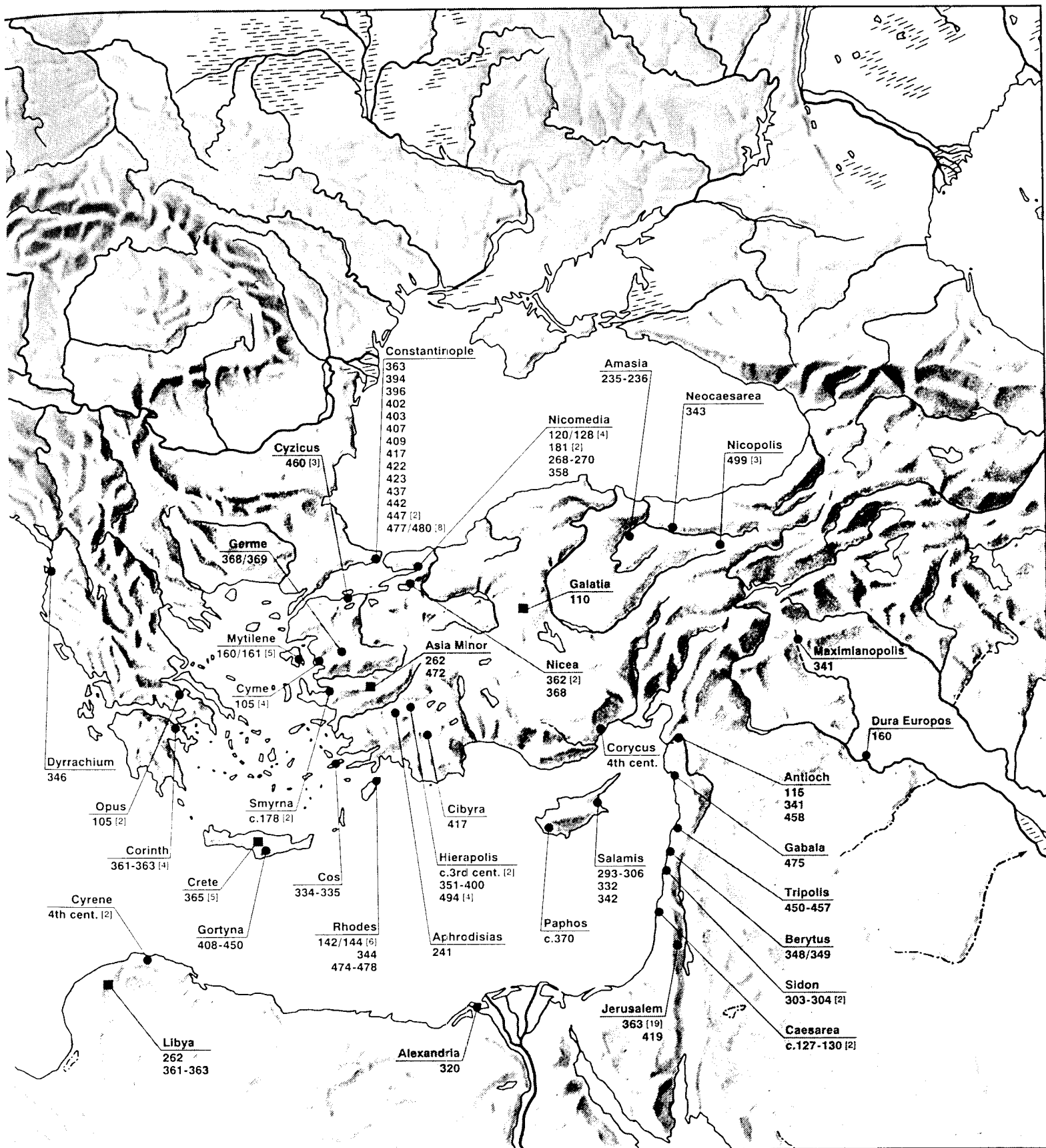




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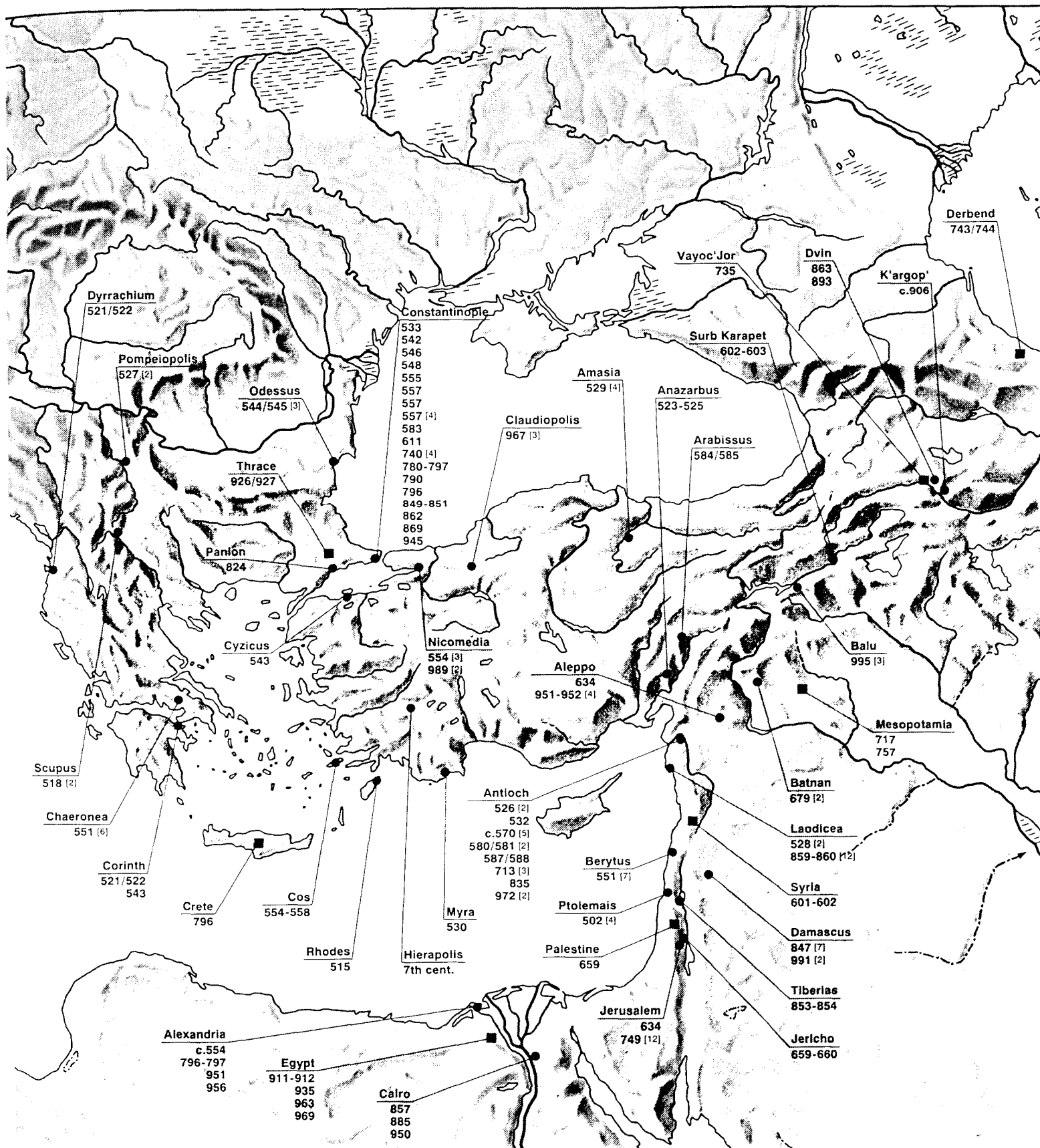
- cities or towns
- countries or regions
- | | number of the places mentioned by the sources





- cities or towns
- countries or regions
- [] number of the places mentioned by the sources





Ancient place names

- Abydus: near Çanakkale, Turkey
 Adhana: Adana, Turkey
 Ad Maiores: Besseriani, Algeria
 Aedepsus: Adipsos, Greece
 Aegae: Nemrud Kalessi, Turkey
 Aegina: Ājina (the island of), Greece
 Aegium: Ājion, Greece
 'Aina d-Gader: Salt, Jordan
 Aleppo: Halab, Syria
 Allifae: Alife, Italy
 Alope: near Gulemion, Greece
 Alponus: near Molos, Greece
 Amasia: Amasya, Turkey
 Anazarbus: near Ayşehoca, Turkey
 Antioch: Antakya, Turkey
 Antipatris: Tel Afeq, Israel
 Apamea: Dinar, Turkey
 Aphrodisias: near Geyre, Turkey
 Apollonidea: near Mecidiye, Turkey
 Arabissus: near Çağilhan, Turkey
 Areopolis (Moab): Rabba, Jordan
 Arsamosata: near Düzağaç, Turkey
 Ascalon: Ashqelon, Israel
 Atalante: Atalantes (the island of), Greece
 Aunobaris: Henschir Kern el-Kebisch, Tunisia
 Azotus: Ashdod, Israel

 Baishan: Bet Shean, Israel
 Bālis: Maskanah, Syria
 Balu: Palu, Turkey
 Batnan (Beit Ma'de?): Sürüş, Turkey
 Beit Gubrin: Bet Gurrin, Israel
 Berytus: Beirüt, Lebanon
 Bosrah: Boşra esh-Shām, Syria
 Botrys: al Batrūn, Lebanon
 Bura: near Valimitika, Greece
 Byblus: Jebail, Lebanon

 Caesarea: near Sedot Yam, Israel
 Calymna: Kalymnos (the island of), Greece
 Camirus: near Kalavarda (the island of Rhodes), Greece
 Campi Macri: Magreta?, Italy
 Chaeronea: Chāronia, Greece
 Chalcis: Chalkis, Greece
 Chios: Khios (the island of), Greece

 Cibyra: near Gölhisar, Turkey
 Classe: near Ravenna, Italy
 Claudopolis: near Vezirköprü, Turkey
 Cleonae: near Selion, Greece
 Cnidus: near Cumali, Turkey
 Cnossus: near Iraklion (the island of Crete), Greece
 Colossae: near Kocabas, Turkey
 Constantinople: Istanbul, Turkey
 Cop'k': Syvrice, Turkey
 Corinth: Korinthos, Greece
 Coronea: Koronia, Greece
 Corycus: near Tekirova, Turkey
 Cos: Kos (the island of), Greece
 Cyme: near Aliaga, Turkey
 Cynus: near Livanatā, Greece
 Cyrene: near Shahhāt, Libya
 Cytinium: near Gravia, Greece
 Cyzicus: near Erdek, Turkey

 Daphne: near Antakya, Turkey
 Daphnus: near Ajios Konstantinos, Greece
 Dar'at: Dar'ā, Syria
 Delos: Dilos (the island of), Greece
 Didyma: near Didim, Turkey
 Dionysopolis: Balçik, Bulgaria
 Diospolis (Lydda): Lod, Israel
 Dulūk: near Gaziantep, Turkey
 Dura Europos: Aş Şalihiyah, Syria
 Dyrrachium: Durrës, Albania
 Dvin: near Artasat, Armenia

 Echinus: Achinos, Greece
 Edessa (al-Ruhā): Urfa, Turkey
 Elaea: near Zeytindağ, Turkey
 Elatea: Elatia, Greece
 Ephesus: Selçuk, Turkey
 Epidaurus: Cavtat, former Yugoslavia

 Faesulae: Fiesole, Italy

 Gabala: Jablah, Syria
 Gallipoli: Gelibolu, Turkey
 Germe: near Soma, Turkey
 Gophna: Jifnā, Jordan
 Gortyna: Ajios Dekā (the island of Crete), Greece

Helenopolis: Hersek, Turkey
 Helice: near Valimitika, Greece
 Heraclea Pontica: Ereğli, Turkey
 Heraclea Trachinea: near Moschohori, Greece
 Herculaneum: Ercolano, Italy
 Hiera: Nea Kameni (the island of), Greece
 Hierapolis: Pamukkale, Turkey
 Hierocaesarea: near Beyobasi, Turkey
 Hims: Homs, Syria
 Hydrax: near 'Ain Mara, Libya
 Hyrcania: near Halipaşa, Turkey

 Iasus: near Güllük, Turkey
 Ibora: near Karadikmen, Turkey
 Interpromium: near San Valentino in Abruzzo Citeriore, Italy

 Japho: Tel Aviv, Israel

 K'argop': near Kyvrak, Azerbaijan

 Lampsacus: Lâpseki, Turkey
 Laodicea [Phrygia]: Goncali, Turkey
 Laodicea [Syria]: Al Lâdhiqiya, Syria
 Larissa: Pelasgia, Greece
 Leben: Lendas (the island of Crete), Greece
 Lindus: Lindos (the island of Rhodes), Greece
 Luna: Luni, Italy
 Lychnidus: Ohrid, former Yugoslavia
 Lydda: see Diospolis
 Lysimachia: Kavak, Turkey

 Mabbug: Manbij, Syria
 Magnesia: Manisa, Turkey
 al-Maṣṣīsa: near Yakapinar, Turkey
 Mawsil: Mosul, Iraq
 Maximianopolis: near Gâvurhori, Turkey
 Methone: Methoni, Greece
 Miletus: near Balat, Turkey
 Moab: see Areopolis
 Mostene: near Turgutlu, Turkey
 Myra: near Demre, Turkey
 Myrina: near Aliğa, Turkey
 Mytilene: Mytilini (the island of Lesbos), Greece

 Naupactus: Navpaktos, Greece
 Nauplia: Nauplion, Greece
 Nawa: Nawá, Syria
 Neocaesarea: Niksar, Turkey
 Nicea: Iznik, Turkey
 Nicomedia: Izmit, Turkey
 Nicopolis [Armenia]: near Suşehri, Turkey
 Nicopolis [Cilicia]: Islâhiye, Turkey
 Nicopolis [Palestine]: near Gezer, Israel
 Nursia: Norcia, Italy

 Odessus: Varna, Bulgaria
 Oeum: near Kiparissi, Greece
 Ophryneum: Erenköy, Turkey
 Opus: Kiparissi, Greece
 Orchomenus: Orchomenos, Greece
 Oreus: Orei, Greece
 Orobiae: Roviä, Greece

 Palnatun: near Tunceli, Turkey
 Panamara: Bağyaka, Turkey
 Paneas: Baniyäs, Syria
 Panephrisis: near Basandili, Egypt
 Panion: near Tekirdağ, Turkey
 Panticapaeum: Kerç, Ukraine
 Paphos: Pafos, Cyprus
 Patara: near Kalkan, Turkey
 Patras (Patrae): Paträ, Greece
 Peparethus: Skopelos (the island of), Greece
 Perinthus: near Marmaraereğlisi, Turkey
 Pescolarido: near Circello, Italy
 Phalara: Styli, Greece
 Philadelphia: Alaşehir, Turkey
 Philippi: Krinides, Greece
 Philomede: Akşehir, Turkey
 Pinara: near Eşen, Turkey
 Pisaurum: Pesaro, Italy
 Pitane: Çandarlı, Turkey
 Poemanenum: near Göbel, Turkey
 Polybotus: Bolvadin, Turkey
 Pompeiopolis: near Aleksinac, former Yugoslavia
 Potentia: near Porto Recanati, Italy
 Potidaea: near Nea Potidäa, Greece
 Praenetus: near Yalova, Turkey
 Privernum: near Priverno, Italy

Ptolemais: 'Akko, Israel	Sitifis: Sétif, Algeria
Qenneshrin: Qinnasrīn, Syria	Smyrna: Izmir, Turkey
Ra'bān: near Yavuzeli, Turkey	Sparta: Sparti, Greece
Raqqa: Ar-Raqqah, Syria	Spoletium: Spoleto, Italy
Reate: Rieti, Italy	Stabia: near Castellammare di Stabia, Italy
Rhegium: near Yeşilköy, Turkey	Stratonicea: Yatağan, Turkey
Rhodes: Rodhos (the island of), Greece	Surb Karapet: near Yaygın, Turkey
Ronsa: near Conza della Campania, Italy	Tall Ḥalid: near Doğanpınar, Turkey
al-Ruhā: see Edessa	Tanġa: Tangier, Morocco
Saepinum: near Altilia, Italy	Tarphe: near Mendenitsa, Greece
Salamis [Cyprus]: near Ammochōstos, Cyprus	Telesia: near Telese, Italy
Salamis [Greece]: Salamis (the island of), Greece	Telos: Tilos (the island of), Greece
Samaria (Sebastia): Sabastiya, Jordan	Temnus: near Menemen, Turkey
Samosata: Samsat, Turkey	Tenedos: Bozca (the island of), Turkey
Sardis: Sart, Turkey	Tiberias: Teverya, Israel
Scarphe: near Molos, Greece	Tilimsān: Tlemcen, Algeria
Scupus: Skopje, former Yugoslavia	Thiatyra: Akhisar, Turkey
Sebastia: see Samaria	Thronium: near Ajios Serafim, Greece
Seleucia Pieria: near Samandağ, Turkey	Tmolus: near Karaköy, Turkey
Sepphoris: Zippori, Israel	Tralles: Aydin, Turkey
Sestos: near Eceabat, Turkey	Tripolis [Phrygia]: near Güney, Turkey
Sidon: Saydā, Lebanon	Tripolis [Syria]: Tarābulus, Lebanon
	Tyre: Sūr, Lebanon
	Vipera: near Gambatesa, Italy

Information concerning the authors of the sources

Brief chronological and general information about authors or texts cited in this catalogue as "sources" are collected here. It does not include authors or texts mentioned as "sources 2" only.

The numbers put in < > refer to the seismic events listed in the catalogue (pp.105 – 406).

Acts of the Apostles (1st century AD.)

The 5th book of the New Testament. The critics ascribe it to the apostle Luke on the basis of linguistical analyses. <087>

Adamnan of Hy (623/625 – 704 AD.)

An Irish monk, born at Drumhome in Donegal. He carried out a number of diplomatic missions on behalf of his people, and was Abbot of Hy (Iona in Scotland) from 679 to 704, the year in which he died. In addition to a *Life of St.Columba*, he wrote a detailed account of a journey to Palestine made by the French bishop Arculf, called *De locis sanctis*. Its 3 books were written about 688. The work is illustrated with drawings of the churches of Jerusalem and other places associated with the life of Christ, and was the principal source of information about these places during the Middle Ages. <239>

Aelian (c.170 – 235 AD.)

A Latin sophist and polygraph. He lived in Rome, and wrote a treatise in 17 books, in Greek, *On the nature of animals*. His *Varia Historia* contains a series of anecdotes. He is included here because he records a report, in connection with the 373 B.C. earthquake at Helice and Bura, suggesting that the behaviour of animals can foretell earthquakes. <024>

Aelius Aristides P. (117 – after 180 AD.)

One of the most famous Greek orators of the Roman imperial period. He was born in Mysia and died after 180. He was a frequent traveller, and composed a range of rhetorical works, including an account of his own life. He was a more or less direct witness of some earthquakes which occurred in Asia Minor in his lifetime. <116>

Agathias (c.536 – 582 AD.)

A Byzantine poet and historian from Myrina. His history of his own times begins where that of his model, Procopius of Caesarea, ends. His historical account of the reign of Justinian covers events from 552 to 558, but the work was unfinished, and was continued by Menander Protector. <218> <219> <220> <221> <225>

Agnellus see **Andreas Agnellus**

Ammianus Marcellinus (c.330 – c.400 AD.)

A Latin historian from Antioch. While his cultural background was East Greek, he was in the Roman army from 353 AD. After 378 he settled in Rome, where he wrote a historical work in Latin. In its original form it consisted of 31 books on the history of the Roman people from 96 to 378 AD. (i.e. from Nerva to Valentinian I and Valens), thereby constituting a continuation of the annals of Tacitus. The only books of his which survive are those concerning the years after 353 AD. Ammianus is considered to be the last great historian of the ancient world. <147> <151> <152> <154>

Amos (8th century B.C.)

One of the 12 minor prophets of the Bible, the earliest of the prophets authors of written works. His book had successive draftings. (001)

Andreas Agnellus (9th century A.D.)

A priest from a wealthy Ravenna family. He received a thorough education at the Basilica Ursiana in Ravenna. His *Liber Pontificalis Ecclesiae Ravennatis* contains biographies of all the archbishops of Ravenna up to Georgius (837–846), with the exception of Valerius (c.788–802) and Petronax. His book was modelled on the *Liber Pontificalis* of the Church of Rome. (245)

Annales Beneventani (11th–12th century A.D.)

These annals are a valuable source for the history of southern Italy, especially as regards the 9th and 10th centuries. They have survived in three redactions, which are now preserved respectively in codices Vat. Lat. 4928 and 4939 in the Biblioteca Apostolica Vaticana, and in some notes in ms. VI.E.43 in the Biblioteca Nazionale in Naples. All three redactions derive from a common source which is now lost but was also used by other southern Italian chroniclers (Lupus Protospata, Falco Beneventanus, Leo Marsicanus and the anonymous author of the *Chronica S.Mariae de Ferraria*). The first codex contains a redaction of the annals written between 1113 and 1118. The second was compiled in 1119. The codex in the Biblioteca Nazionale in Naples can be dated to between 1099 and 1118. All these codices come from the monastery of Santa Sofia at Benevento. (297)

Annales Fuldenses, sive annales regni Francorum orientalis

(second half of the 9th century A.D.)

There has been much debate as to the authorship and unity of these annals. They were first published by G.H.Pertz, who attributed them (1829, p.338) to an unknown monk from the Abbey of Fulda. When Kurze (1891, 1892 and 1903) subsequently republished them, he maintained that they had been written by Einhard, the biographer of Charlemagne, who died in the monastery at Seligenstadt in 840. However, this theory was vigorously rejected by Hellmann (1908 and 1909). Kurze replied in 1911, and a fresh riposte from Hellmann was published in 1912. Hellmann 1913 claimed that he could demonstrate the unity of the work, although it is traditionally divided into four parts, and could show that it had been written by a single anonymous author who lived in the second half of the 9th century. (262)

Annales Laureshamenses, pars altera (9th – 10th century A.D.)

The second part of these annals was written by a number of different authors, all of whom were monks in the monastery at Lorsch in the diocese of Mainz. (251)

Annales Ravennates (6th century; copy of the 11th century A.D.)

B.Bischoff and W.Koehler (1939) first published ms.202 from the Cathedral Library at Merseburg, identifying it as a copy, dating to the first half of the 11th century, of a 6th century text. The manuscript concerned is a version of the *Fasti consulares Ravennates*. For the first half of the 5th century there are considerable gaps: the *Fasti Vindobonenses priores* do not cover the years 404–454, and there is little information in the brief *Fasti Vindobonenses posteriores*, which deal with the years 388–437. The *Annales Ravennates* repeat in its entirety the original text from Ravenna. At the side of the account of the earthquakes of 429 and 443 at Ravenna there is a small drawing, which has been fully discussed by W.Koehler. (175) (179)

Anonymous Ecclesiastical History

An epitome of ecclesiastical history preserved in the Vatican codex *Parisinus Graecus* 1555A, ff.7r-13r. It was published by Cramer in 1839. <211> <225>

Anonymous lament (989 A.D.)

A Greek rhetorical composition written on the occasion of the collapse of the church of S.Sophia in Constantinople in 989. <298>

Anonymus Valesianus = *Valesiana Excerpta* (4th – 6th century A.D.)

This is the name given to two late antique historical texts which were first published by H.Valesius in 1636. The first recounts the life of the emperor Constantine I (280–337), and is based on a collection of 4th century biographies; the second dates to the 6th century, covers the period 474 – 626 A.D., and is particularly concerned with the reign of Theodoric. <194>

al-Antaki, Abū'l-Faraj Yahyā ibn Sa'īd (980? – 1066 A.D.)

An Arab historian and physician, well known for his continuation of the *Chronicle* of Eutychius of Alexandria (see Ibn Batrīq). He was a Melchite Christian, and lived in Egypt for the first forty years of his life. From 1014 onwards, he lived at Antioch under Byzantine rule. His sources are Islamic, Greek and Antiochene Christian. <288> <291> <293> <294> <298> <299>

Antonini Placentini Itinerarium (6th century A.D.)

This is one of the itineraries written for the use of pilgrims visiting the Holy Places in Palestine. It dates to the 6th century. <218>

Apollonius (2nd – 1st century B.C.)

A Greek text containing a collection of *Mirabilia*. It is attributed to a certain Apollonius, about whom nothing is known. <003>

Apollonius Grammaticus (before the 1st century B.C.)

He is mentioned by Phlegon in connection with the report of an earthquake in Asia Minor during the reign of Tiberius (14–37 A.D.). A number of different writers are known by this name, and it is not possible to establish more precise information about him. <079> <082>

Appian (2nd century A.D.)

A Greek historian who was born at Alexandria, probably during the reign of Trajan (98 – 117). He went to Rome, where he held a number of important positions. It was during the reign of Antoninus Pius (138 – 161) that he wrote his *History of Rome* in 24 books, covering the period from the origins of the city to the death of Trajan. His sources were Polybius, Posidonius, Sallust and Livy. <058> <062>

Aristotle (384 – 322 B.C.)

A Greek philosopher. His works embrace all branches of knowledge, and were intended partly for professional teaching purposes and partly for public consumption. Many of his texts have survived in Greek as well as in Latin and eastern languages. His theory of earthquakes, which was accepted for more than eighteen hundred years, is worked out in book II of the *Meteorologica*. The treatise on the cosmos for Alexander, in which these theories are partly modified, is considered by some to be by Aristotle himself, and by others to be the work of a disciple. <015> <024> <025> <026> <029> <030>

Asclepiodotus (1st century B.C.)

A pupil of Posidonius, who developed his master's work in the natural sciences as well as in other fields. We know nothing of his life, beyond the fact that he lived in the 1st century B.C. He is referred to in Seneca's *Naturales Quaestiones* in relation to an earthquake which occurred before the 1st century B.C. (040)

Athanasius of Alexandria (c.295 – 373 A.D.)

One of the Church Fathers. He wrote various theological and hagiographical works. His *Festal Letters*, which he began in 329 and continued with brief interruptions until 373, are a collection of the letters he sent every year to the various dioceses to announce the date of Easter. Almost all the Greek original has been lost, but some letters have survived in eastern translations. The *Syriac Index*, which mentions the earthquake of 21 July 365, is preserved in an 8th century manuscript, of which the original text must date to shortly after Athanasius' death. (154)

Augustine (354 – 430 A.D.)

A saint and Father of the Latin Church. He was born at Tagaste in Numidia (Algeria). After leaving Carthage, where part of his education had taken place, he went to Rome and then Milan, where he obtained a chair of rhetoric. Under the influence of Ambrose and his preaching, he was converted to Christianity. He returned to Africa in 388, and became bishop of Hippo. (171) (172)

Aurelius Victor (4th century A.D.)

A historian of African origin. In 361 A.D. he was governor of Pannonia and in 389 he was made prefect. Probably after 360 he wrote a work entitled *Caesares*, on the history of the Roman emperors from Augustus to Constantine. The *Epitome de Caesaribus*, referred to as Pseudo-Aurelius Victor, has been falsely attributed to him. (116)

Avot de-Rabbi Nathan (3rd – 5th century A.D.)

One of the so-called extra-canonical minor tractates of the Talmud, generally printed at the end of the fourth division *Nezikin* (Damages) of the Babilonian Talmud. It contains a homiletical exposition and expansion of *Mišnah Avot*, a collection of ethical maxims and aphorisms. (001)

Bartolomeo da Rossano (10th – 11th century A.D.)

A disciple of the more famous St. Nilus, founder of the Abbey of Grottaferrata (Rome) whose biography he wrote. He became the fourth abbot of the monastery. In addition to this work, he wrote many hymns (preserved among the precious Greek manuscripts of Grottaferrata), as well as a *Typicon* (book of general liturgical rubrics). (287)

Bianor (1st century A.D.)

A Greek writer of poetic epigrams. He came from Bithynia and was alive at the time of the earthquake at Sardis in 17 A.D., which he refers to in an epigram now in the *Palatine Anthology*. (079)

Callisthenes (born about 370 B.C.)

A Greek historian from Olynthus. He was related to Aristotle and became court historian to king Alexander of Macedon, whom he accompanied on his Asian expedition. In addition to historical writings, he also composed antiquarian, philosophical and scientific works. His account of the earthquake at Helice and Bura in 373 B.C. is important. (023) (024)

distinguish between the various components of the books, especially since they have reached us through a complicated and late tradition. The wording of prophecies preserves the memory of really happened events. <112> <120>

Socrates Scholasticus (380 – 439/450 AD.)

A Byzantine writer. His *Historia Ecclesiastica* continues the work of Eusebius from the abdication of Diocletian (305 AD.) up to the year 439. He is primarily interested in the history of the Church, but also includes secular events at Constantinople.

<138> <153> <154> <155> <156>

Sozomen (end of the 4th – beginning of the 5th century AD.)

Little is known of the life of this Byzantine historian contemporary of Socrates Scholasticus. Amongst his various works is an *Ecclesiastical History* for the years 324–421, which takes a providential view of events. It is often more exhaustive than the work of Socrates, because greater care is taken in collating sources. <153> <154>

Stephen of Tarōn (9th – 10th century AD.)

Little is known of his life. He came from the province of Tarōn, and was commissioned by the *katholikos* Sargis (982 – 1019) to write a *Universal History* at the beginning of the 11th century. This work focuses on Armenia and Byzantine-Armenian relations.

<273> <300>

Strabo (64 B.C. – 19 AD.)

A Greek historian and geographer, who was born at Amasea in Pontus. His historical writings are lost, but the 17 books of his *Geographia* have survived. The first 2 books deal with the mathematical aspects of geography; books 3-10 are about Europe; books 11-16 are about Asia, and book 17 is about Africa. His work is important both for the historical information it provides, and for the various *excursus*. <024> <027> <028>

<040> <055> <057> <062> <072> <079>

“Suda” or Suidas (10th century AD.)

The name given to a Byzantine lexicon (once assumed to have been compiled by a lexicographer called Suidas). It contains about 30,000 Greek entries in alphabetical order, taken from earlier lexicons. It is a very important work both for lexical matters and for the historical and literary information which it contains. <103>

Suetonius (70 – 140 AD.)

A Latin author, whose *De vita Caesarum* is a series of biographies of emperors from Julius Caesar to Domitian. He also wrote *De viris illustribus* and other grammatical and rhetorical works. <072> <079> <083> <096> <098> <100> <102>

al-Suyūtī, Abū’l-Faḍl ‘Abd al-Rahmān ibn Abī Bakr (1445 – 1505 AD.)

An Arab polygraph, who was born in Cairo. He was the most prolific of all Arab writers (561 works), and taught several disciplines at the universities of Cairo and Damascus. <261>

Symeon Magister see **Pseudo-Symeon Magister and Logothete**

Symmachus, Quintus Aurelius (c.340 – 402 AD.)

A Latin writer of letters and *relationes*, who held a number of important political posts. He was *pontifex maior* about 345, *proconsul Africae* in 373–375, *praefectus urbi* in 384 and *consul* in 391. He is considered to be one of the most important late antique writers of letters. About 900 of his letters, in 9 books covering the period 364–402, have survived, as well as 49 *relationes*. <159>

Synaxarium Ecclesiae Constantinopolitanae (c.10th century AD.)

A collection of lives of saints arranged according to the days of the liturgical calendar. Little is known about how the *Synaxarium* was compiled. There were several editions, of which the most important seems to have been made about 965–970, on the orders of emperor Constantine VII Porphyrogenitus. <252> <298>

Syncellus see **Georgius Syncellus**

Synesius of Cyrene (c.370–413 AD.)

A neoplatonic philosopher. He studied at the school of Hypatia in Alexandria, but later moved closer to the Gnostics. He spent three years at Constantinople and then went to Athens, later returning to his own country, where he became a soldier. In 411, however, he accepted the position of bishop of Ptolemais. His surviving works consist of hymns, speeches and 159 letters, three of which are not authentic. <162> <163>

al-Tabari, Abu Ja'far Muhammad ibn Jarir (839–927 AD.)

The most famous Arab historian. After studying in Baghdad and then in Basra and Kufa, he returned to Baghdad, where he spent the rest of his life as a teacher. In his works he dealt not only with history and Koranic exegesis, but also with poetry, lexicography, grammar, medicine and mathematics. What remains of his *Annals* is no more than an abridged version of the enormous original. <254> <270> <271> <276> <277>

Talmud (3rd–6th century AD.)

The body of teaching which compares the commentary and discussions of the Mišnah that took place in the academies of Babylonia (Babylonian Talmud, completed in the 6th century) and of Palestine (Palestinian or Jerusalem Talmud, completed at the end of the 4th century). It contains the text of the Mišnah and the interpretation, known as Gemara. <125>

Tacitus (c.55–c.120 AD.)

A Latin historian, who was also a senator, magistrate, provincial governor and orator. His first historical work was the *Historiae*, of which only the first four books and part of the fifth survive. It covered the events of the years 68–96. Later on he wrote what are known as the *Annales ab excessu divi Augusti libri*. They were concerned with the period from the death of Augustus (14 AD.) to 68, but only books 1–4, part of book 5, and books 11–16 survive. He made use of documents as well as historical works, of which we cannot always identify the authors. <079> <080> <081> <089> <090> <092> <095> <096>

Theodoret (c.393–460 AD.)

A native of Antioch who was educated at Cyrrhus, of which he became bishop. Of his many works, the *Historia Ecclesiastica*, written about 444 AD., is particularly important. It provides a picture of the life of monks in northern Syria in the 4th and 5th centuries AD. <153> <164>

Theophanes (760–818 AD.)

A Byzantine chronicler who wrote a history of events from 284 to 813 AD. His work is important for comparing biblical and other Christian chronologies, and for the information it provides about the western and eastern empires. His sources are ecclesiastical histories and chronicles, as well as historians such as Procopius and Agathias. His work was continued (*Theophanes Continuatus*) in the form of a compilation by various hands. He is an important source for the dating of a number of earthquakes. The chronological system used by Theophanes has posed a problem for scholars, because there are certain periods for which the year of the world does not correspond

to the indiction. According to some scholars, this discrepancy only applies to the period from 609/610 (*annus mundi* 6102) to 772/773 (*a.m.* 6225), excluding the years 713/715 – 725/726 (*a.m.* 6207–6218), where the indiction is one unit greater than the age of the world. They attribute this to a mistake made by Theophanes in organising his material. According to other scholars, however, the discrepancy between year of the world and indiction is not a real one, being simply the result of Theophanes' beginning the year on 25 March instead of 1 September (Grumel 1934, pp.369-405 and 1958, pp.95-6).

⟨135⟩⟨136⟩⟨138⟩⟨140⟩⟨141⟩⟨145⟩⟨147⟩⟨176⟩⟨177⟩⟨180⟩⟨183⟩
 ⟨189⟩⟨193⟩⟨203⟩⟨205⟩⟨206⟩⟨211⟩⟨213⟩⟨214⟩⟨215⟩⟨216⟩⟨219⟩⟨222⟩⟨223⟩
 ⟨224⟩⟨225⟩⟨226⟩⟨240⟩⟨242⟩⟨243⟩⟨244⟩⟨247⟩⟨248⟩⟨249⟩⟨250⟩⟨253⟩⟨255⟩
 ⟨256⟩⟨259⟩⟨272⟩⟨282⟩⟨285⟩

Theophylactus Simocatta (late 6th century – 7th century AD.)

A Byzantine historian, who was born in Egypt in the late 6th century. He wrote a history of the reign of Maurice (582 – 602) in 8 books. (228)

Theopompus of Chios (4th century B.C.)

A Greek historian who was born around 378 B.C., and was in the service of Philip II, Alexander the Great and Ptolemy I. He wrote a number of rhetorical and historical works. His *Hellenics* narrates events from the end of Thucydides' work (411/410 B.C.) to 394 B.C., whereas his *History of Philip* covers the period up to 360 B.C., and contains many antiquarian and mythographical *excursus*. (003)

Thomas Artsruni (11th century AD.)

An Armenian historian who wrote a *History of the House of the Artsrunik*. It covers the period from the origins to 904 AD., and was continued up to 1326 by various unknown hands in a discontinuous way. (277)

Thucydides (c.460 – after 404 B.C.)

A Greek historian. His *Peloponnesian War* was completed by Xenophon. It is the principal source for Greek history from the second half of the 5th century B.C. His accounts of earthquakes are of major importance, not only for the completeness of his descriptions but also for the fairly accurate chronology. (008)⟨011⟩⟨012⟩⟨014⟩

Typicon of the Great Church (9th – 10th century AD.)

A liturgical book, arranged according to the Byzantine calendar, for services in the church of S.Sophia in Constantinople. It provides instructions for the services and chants to be used for individual feasts, whether fixed or movable. (247)

Typicon of the S.Salvatore (Messina)

A liturgical book, arranged according to the Byzantine calendar, for services in the church of S.Salvatore in Messina, edited by Arranz (1969). (268)

Varro, Marcus Terentius (116 – 27 B.C.)

A Latin writer. His many erudite works were a mine of information for the ancients and the Middle Ages. He is referred to in the *Naturalis Historia* of Pliny. (066)

Vatican Paradoxographer (2nd century AD.?)

This work, preserved in a Vatican manuscript, is devoted to the narration of extraordinary events in history and nature. (003)

Velleius Paterculus (c.19 B.C. – c.30 AD.)

A Latin historian who held official positions under Augustus and Tiberius. His

Historia Romana is a summary in 2 books of the history of Rome up to 30 AD. His principal sources for the republican period are Nepos, Livy and Sallust. For the period close to his own, he relied on his personal knowledge and archive materials. (079)

Victor of Tunnuna (died after 566 AD.)

A bishop of the African city of Tunnuna who defended the Three Chapters schism. He was exiled in 555, and subsequently confined in a monastery at Constantinople, where he remained until his death. He wrote a *Chronicle* in Latin in which he narrates the most important events of Church and Empire. (196)

Virgil (70 – 19 B.C.)

A Latin poet. His *Georgics* have been used in this catalogue. (069)

The Vision of Daniel (9th century AD.)

A Greek Apocalypse text which adds to earlier ancient prophetic traditions with a fairly reference to events of Sicily in the 9th century. (268)

Xenophon (c.426 – c.355 B.C.)

An Athenian writer. Amongst his historical writings is the *Hellenica* in 7 books, which constitutes a continuation of the work of Thucydides. (035) (037) (040)

al-Ya'qūbī, Ahmad ibn Abī Ya'qūb (? – 897 AD.)

An Arab historian and geographer who spent his youth in Armenia and Iran. He died in Egypt. His works reveal a true passion for astrology, naturalistic sciences and topography. His sources are never quoted, and remain unidentified. (269) (271)

Yebamoth see Talmud

Zachariah of Mitylene (6th century AD.)

Also known as Zachariah the Rhetor and Zachariah the Scholastic. He came from Maiumas near Gaza, and wrote an *Ecclesiastical History* in Greek, which was used by Evagrius. The text we now have is a Syriac reworking, used as part of a universal history which goes from the Creation to the year 569 AD. (203)

Zechariah (6th century B.C.)

One of the 12 minor prophets of the Bible. According to the critics, the chapters 1-8 can be considered authentic; the chapters 9-14 are later (2nd century B.C.). The style of the visions of Zechariah is at the basis of the apocalyptic literature. (001)

Zonaras, John (12th century AD.)

A Byzantine historian and writer on ecclesiastical subjects, who held an official position at the court of Constantinople. He became a monk around 1118 and retired to the Monastery of Mt.Athos. In addition to an epitome of world history from the Creation to the year 1118, he wrote various commentaries on canon law and some hymns. His sources include such important historians as Herodotus, Xenophon, Plutarch and Dio Cassius. (204) (238) (292)

Bibliography

Abbreviations

AE	L'Année Épigraphique
ASS	Acta Sanctorum
BCH	Bulletin de Correspondance Hellénique
BGA	Bibliotheca Geographorum Arabicorum
BHG	Bibliotheca Hagiographica Graeca
BISI	Bullettino dell'Istituto Storico Italiano per il Medio Evo e Archivio Muratoriano
BS	Bibliotheca Sanctorum
BT	Bibliotheca scriptorum Graecorum et Romanorum Teubneriana
CC	Corpus Christianorum
CFHB	Corpus fontium historiae Byzantinae
CIG	Corpus Inscriptionum Graecarum
CIL	Corpus Inscriptionum Latinarum
CSCO Arab.	Corpus Scriptorum Christianorum Orientalium, Scriptores Arabici
CSCO Syr.	Corpus Scriptorum Christianorum Orientalium, Scriptores Syri
CSEL	Corpus Scriptorum Ecclesiasticorum Latinorum
CSHB	Corpus Scriptorum Historiae Byzantinae
FGrHist	Die Fragmente der Griechischen Historiker, hrsg. von F.Jacoby, I-III C 2, Berlin-Leiden 1923-58
FHG	Fragmenta Historicorum Graecorum
FSI	Fonti per la Storia d'Italia
GCS	Die Griechischen Christlichen Schriftsteller der ersten Jahrhunderte
ICUR	Inscriptiones Christiane Urbis Romae
IG	Inscriptiones Graecae
IGR	Inscriptiones Graecae ad res Romanas pertinentes
IGSKl	Inschriften Griechischer Städte aus Kleinasien
ILS	Inscriptiones Latinae Selectae
MGH, AA	Monumenta Germaniae Historica, Auctores Antiquissimi
MGH, SRG	Monumenta Germaniae Historica, Scriptores Rerum Germanicarum in usum scholarum separatim editi
MGH, SRLI	Monumenta Germaniae Historica, Scriptores Rerum Langobardicarum et Italicarum
MGH, SS	Monumenta Germaniae Historica, Scriptores (in folio)
PG	Patrologiae cursus completus, series Graeca
PL	Patrologiae cursus completus, series Latina
PRLE	<i>The Prosopography of the Later Roman Empire</i> , vol.I, ed. A.H.M.Jones, J.R.Martindale and J.Morris, Cambridge 1971; vol.II, ed. J.R.Martindale, Cambridge 1980, vol.III, ed. J.R.Martindale, Cambridge 1992
RIS	Rerum Italicarum Scriptores
RE	Paulys Realencyclopädie der classischen Altertumswissenschaft
SEG	Supplementum Epigraphicum Graecum
SGDI	Sammlung der Griechischen Dialekt-Inschriften
Syll. ³	Sylloge Inscriptionum Graecarum
TAM	Tituli Asiae Minoris

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