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«The Byzantine Sources as Documentary Evidence for the Reconstruction of Historical Climate»

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The Byzantine sources as documentary evidence for the reconstruction of historical climate

Ioannis Telelis & Evangelos Chrysos

Summary

This paper presents an attempt to evaluate the significance of the Byzantine historical sources to historical climatology and the potential contribution of climatological evidence from these sources to the reconstruction of the Medieval climate of the Eastern Mediterranean basin. A net of methodological observations on the difficulties inherent in the various types of the narrative sources and the trustworthiness of the climatological information deriving from them, is generally outlined as it arises from the *corpus* of information developed by a research project still in progress at the University of Ioannina. The historical and philological efforts necessary to approach in a scientific way climatological evidence from the Byzantine sources are demonstrated by an example: in the winter 763/64 A.D. the Black Sea froze and big ice-drifts covered the surface of the Bosphorus, up to the Marmara Sea. This extraordinary meteorological phenomenon is documented by contemporary and Later Byzantine chronographers whose trustworthiness is tested and correlated with accounts from Latin annals and chronicles of the same and later periods.

Zusammenfassung

In diesem Beitrag wird versucht, die Bedeutung der Byzantinischen Quellen für die historische Klimaforschung und für die Rekonstruktion des mittelalterlichen Klimas im östlichen Mittelmeerraum darzustellen. Im Rahmen eines an der Universität von Ioannina gegenwärtig laufenden Forschungsprojektes konnten wertvolle Informationen über die zahlreichen methodischen Probleme, die mit der Auswertung überlieferter Quellen verbunden sind, und über die Verläßlichkeit der daraus abgeleiteten Klimainformationen gewonnen werden. Die bei der wissenschaftlichen Auswertung der Byzantinischen Quellen in bezug auf die darin enthaltene Klimainformation gebotene, sorgfältige Anwendung historischer und philologischer Methoden wird anhand eines Beispieles verdeutlicht: Im Winter 763/64 A.D. froren Teile des Schwarzen Meeres zu und mächtige Eisschollen trieben durch den Bosporus bis ins Marmarameer. Dieses bemerkenswerte meteorologische Phänomen wurde durch zeitgenössische und spätbyzantinische Chronisten beschrieben. Die Verläßlichkeit dieser Berichte wurde getestet, indem sie mit zeitgenössischen und späteren lateinischen Annalen und Chroniken verglichen wurden.

1. Introduction

In the flourishing international cooperation for the reconstruction of the European climate in historical times (ALEXANDRE, 1987; PFISTER, 1988), there has so far been no serious attempt for making use of the information hidden in Greek Medieval historical sources. Only sporadic evidence has been available to scholars from the time of NEUMANN & PARTSCH (1885) and the less known Russian geographer, count of TCHICHATCHEF (1864), and to later compilators such as EASTON (1928), HENNING (1904) or WEIKINN (1958), who usually repeat each other without studying the evidence itself. The reason for this is, of course, to be found in the Medieval expression "Graeca sunt non leguntur" or in its American version: "it's Greek to me"!

In 1987 D. METAXAS, the meteorologist at the University of Ioannina, joined a European community project (contract EV-0028-GR/TT) on "The reconstruction of past Mediterranean climate in historical time". His interest to close the just mentioned gap in climatological scholarship with his contribution to the project caused him to seek the cooperation of the Historical Department at the same University. In this department, though we had so far no experience in this type of research, we accepted his proposal for the following reasons:

(a) an increasing awareness of the climatological problems of our times (greenhouse effect etc.) and the wish or the obligation to support any attempt tackling these problems;
(b) our expectation that through this cooperation and the attempt to reconstruct the historical climate, we may find answers to some crucial historical questions such as the ups and downs in the development of the Medieval society, the political changes, and the material culture, for which the narrative historical evidence is not sufficient for providing definite answers. For instance we lack sufficient evidence to explain the decline of the Late Antique economy and culture in the sixth century or the impressive wealth we meet in the ninth century in Eastern and Western Europe;
(c) last but not least: in many aspects historical research has reached a deadlock. After her devotion to the study of the role of personages in historical developments, due to given political patterns, *historia* as a scientific discipline turned her head towards the study of political structures, states, and statehoods. Then came MARX who demonstrated the necessity of studying the economic and social aspects influencing the historical phenomena. In the last decades we grew more interested in analyzing the position of the individual in history and studied the behaviour and the mentality of the average citizen. Now one has the feeling that we should start facing more consciously questions concerning the impact of nature on political, social and economic developments - questions we have forgotten to ask in the past.

1.1 The research project at the University of Ioannina

Responding to D. METAXAS' invitation two graduate students of the Byzantine Department (Mr. TELELIS and Mrs. MOYSIDOU) were appointed to undertake the task of reading thoroughly all the Byzantine sources from 300 to 1500 A.D. in original Greek, which promised to offer information of climatological value. The project was enlarged by asking F. NOTORA, University of Athens, to provide us with material from marginal notes in Greek manuscripts - she has made a compilation of approximately 5,000 Greek manuscript notes - and, finally, we gained the cooperation of Dr. RADICA of the Serbian Academy of Sciences at Belgrade, who has studied the Early Slavonic sources up to 1500 A.D.

Until now we have studied and excerpted around 60 large historical works, 11 church histories, 80 chronicles, 5 geographical surveys, and around 50 Saints' Lives. As a result of this effort, approximately 600 concrete pieces of meteorological and parameteorological evidence and about 700 further accounts referring to this evidence have been obtained so far.

We still have to read and study a number of sources: approximately 150 Saints' Lives and a number of collections of correspondence. We also intend to study in a special section the theoretical cosmological and agricultural treatises which, even if not providing concrete meteorological evidence, will nevertheless help to elucidate the sensitivity and knowledge of the Byzantines about the impact of nature on man in Medieval times. Due to reasons of academic discipline our team has not studied yet any documentary sources for the period after 1500 A.D. with the exception of some secondary works and compilations, although we expect that the material from this later preinstrumental period will certainly provide us with much more useful information especially for the Little Ice Age (GROVE, 1988).

Nevertheless, we hope that soon we shall be able to excerpt all other Greek sources of the Classical, Medieval and Postbyzantine times with the support of the new "*Thesaurus Linguae Graecae*", available as a computer programme called IBYCUS, developed at the University of California at Irving. We hope that with some hundred keywords and the proper "Find Command" all references to natural phenomena will be at our disposal thanks to a software programme called "Pandora". (This will soon be our Pandora box!)

1.2 Methodological aspects concerning documentary evidence of climatological value from the Byzantine narrative sources

As for the reconstruction of historical climate we cannot claim that the results of our research are satisfactory so far. The direct meteorological evidence providing data on changes in temperature or humidity, adequate for quantification in terms of standard meteorological variables and for constructing meteorological time series to introduce long-term fluctuations, is very scarce and fragmentary. More often we have accounts on parameteorological phenomena such as famines, epidemics etc., usually not offering any explanations

about possible climatological causes. Thus, we must underline that our information does not go much beyond the general observations made by INGRAM et al. (1978: 332): "Most historical information is not so readily quantifiable in terms of meteorological variables, as the data are discontinuous, non-homogeneous, and show a marked bias towards the recording of extreme events."

Of course, there is a number of extreme individual meteorological events recorded in the Byzantine and Oriental sources. One such event, like the severe winter 763/64 A.D. is described further below. However, these extreme events belong to the category described by FARMER & WIGLEY (1983: 180): "Although individual events such as gales and thunderstorms may cause considerable damage to harvests, their effects can be very local and their severity need have no bearing on the general evolution of the climate".

Although the study of the available sources has not been completed yet, we have come to the conclusion, disappointing though not despairing as it may be, that the contribution of the Byzantine, Oriental, and Slavonic sources to the reconstruction of the European climate for the period before 1500 A.D. is not expected to be substantial but rather secondary and merely supportive to the efforts of other methods and disciplines. As a matter of fact we shall have to rely basically on the results of other sorts of proxy data research such as tree-ring evidence, pollen and sediment analysis etc. which, contrary to other parts of Europe, have not been sufficiently developed in Greece and the other Southeastern European and Middle East countries.

With regard to our documentary evidence, for a reliable use of our information we have to overcome some difficulties inherent in the type of the sources providing them. The Byzantine narrative sources belong actually to three different literary genres (HUNGER, 1978; KRUMBACHER, 1958):

(1) The actual historical writers such as AMMIANUS MARCELLINUS, ZOSIMUS, and PROCOPIUS or the later MICHAEL PSELLUS, ANNA COMNENE, or IOANNES CANTACUZENUS;
(2) the chronographers who write universal chronicles starting from the Creation of the World up to their days, such as IOANNES MALALAS (sixth century), THEOPHANES (ninth century) or IOANNES ZONARAS (twelfth century);
(3) The church historains such as EUSEBIUS, SOCRATES, EUAGRIUS or NICEPHORUS CALLISTUS XANTHOPULOS.

Because of certain norms in literary tradition of writing historical works, the authors in these three different genres obey to well established rules: the historians imitate the model of the classical Greek writers, mainly THUCYDIDES, and they are interested in demonstrating the initiatives or the deeds of their heroes who are usually their benefactors. For this reason they are less interested in describing meteorological phenomena which according to their sophisticated attitude are irrelevant to the political events they want to describe. The

philological study of stereotype expressions describing meteorological phenomena such as "severe winter", "much snow" etc. may prove to be very helpful for the assessment of the trustworthiness of this sort of evidence.

More useful are the accounts offered by the chronographers. Their aim is to demonstrate the steady and powerful interference of God in the development of human history under a concrete eschatological scope. Because of this, they are more interested in recording physical phenomena (famines, epidemics, earthquakes or meteorological events) which they present as God's acts of educational punishment of His people. Opposite to what BELL & OGILVIE (1978: 333) observed concerning the western Latin Medieval universal chronographers, namely that "they were unable to distinguish fact from legend, the accurate from the erroneous, or to identify contemporary and non-contemporary sources", we must underline that the Byzantine and Oriental chronographers are usually more trustworthy and do provide some reliable information; of course, only if it is analyzed carefully. The information offered by Byzantine and some Oriental chronographers is of particular value because quite often they give us a rather accurate chronological frame on an annual basis, although they unfortunately fail to offer us more precise dates.

Some useful information is found, thirdly, in the writings of the ecclesiastical historains who stand between the political historians of the Classical type and the chronographers of the Medieval type in their aims and intentions in literacy and in exactness.

Furthermore, there existed a vast amount of Saints' Lives (*Vitae Sanctorum*) of the Byzantine Church - HALKIN (1957) counted 4,500 published Lives of Greek Saints. As a matter of fact these writings have minor importance as historical sources. Nevertheless, they are much more trustworthy when they mention physical phenomena occurring during their heroes' lives. But unfortunately, they usually offer no chronological reference to these events and this diminishes, of course, their value. However, this conclusion is not meant to support the decision of FARMER & WIGLEY (1983), who rejected *a priori* all Saints' Lives "as their composers were necessarily subject to too many distortions".

2. The winter 763/64 A.D. General description and sources' overview

One of the most astonishing meteorological phenomenon for the Black Sea, Bosphorus, and Constantinople area, occurred in 763/64 A.D.: the northern shores of the Black Sea froze and large ice-drifts moved towards the south, crossed the Bosphorus and crashed against the city walls of Constantinople, the capital of the Byzantine Empire, causing serious damage. Meanwhile the surface of the sea between the European and the Asiatic coast of the Bosphorus froze and was converted into a passable dry land. In March an exceptional period of drought allegedly followed causing the stagnation of springs and rivers.

This climatological phenomenon is documented by two of the most important Byzantine chronographers (THEOPHANES, 1883: 434-435; NICEPHORUS, 1880: 67-68), who claim to

be eye-witnesses. The same event is described by eight further posterior Byzantine sources (cp. Fig. 1 for a stemma of these sources and table 1 for a list of them). The winter of 763/64 is furthermore described as very severe by thirty Latin annals and chronicles (cp. table 1).

2.1 Classification of the historical sources

The historical sources providing us with information about this meteorological event can be classified as following, according to the philological genre they belong to, the probable comtemporaneity of the authors to the event, and the geographical place and time in which the authors lived and wrote (INGRAM et al. 1981).

Concerning the philological genre of the sources we should mention that all sources are chronicles. This can be explained by the fact that the period of the eighth and ninth centuries in the Byzantine History is covered mainly by chronicles and Saints' Lives written in later time (KARAYANNOPULOS & WEISS, 1982: 337; HUNGER, 1978: 331).

On the other hand, we must stress the fact that only two out of a total of ten Byzantine chronicles and additionally two out of thirty Latin annals and chronicles can be designated as contemporary to the severe winter.

Such a classification of authors and sources into contemporary and later ones is of great importance because we can approach their evidence with greater or lesser "suspiciousness", taking into consideration that the later authors, as a rule, copy in a more or less faithful way the anterior sources, usually without questioning and testifying their material. Thus, the percentage of evidence rejected as deriving from later sources is high, unless they can provide us with additional information which they gained from sources lost or unknown to us. Unfortunately this did not happen in our case. Likewise, the question why later chronographers were so very interested in recording this exceptional event may be useful for our research because it indicated the impression this extraordinary event made on them.

The third parameter for the historical and philological scrutiny of our sources concerns their geographical origin: it is self-evident that a chronicle written in Constantinople (THEOPHANES, 1883: 434-435), is most trustworthy when it speaks about ice-drifts in the Bosphorus and also of extreme importance is the fact that this indigenous source harmonizes to a Latin annal originating from Central Europe (*Annales Regni Francorum*, 1950: 22), because both speak about the same winter at two very different and remote places. But let us examine our sources more closely.

2.2 The accounts of the contemporary sources

The two chronographers contemporary to the event, who offer us information through their parallel reports, are: THEOPHANES THE CONFESSOR, who was born in Constantinople in 760

and wrote his Chronicle between 810 and 814 (HUNGER, 1978: 335), NICEPHORUS, later patriarch of Constantinople, who was born in 758 and wrote his Brevarium between 775 and 787 (HUNGER, 1978: 344). Although it is accepted that the two writers did not know each other, so the probability of a mutual copying should be excluded (KRUMBACHER, 1958: 343), the resemblance in the course of their information and the fact that nothing significant differs, is changed, added or removed by THEOPHANES remains indisputable. THEOPHANES (1883: 434-435) has the following story to tell about the winter of that year:

<434> "In the same year it was bitterly cold after the beginning of October, not only in our land, but even more so to the east, west, and north. Because of the cold, the north shore of the Black Sea froze to a depth of thirty cubits a hundred miles out. This was so from Ninkhia to the Danube River, including the Kouphis, Dniester, and Dnieper Rivers, the Nekropela, and the remaining promontories all the way to Mesembria and Medeia. Since the ice and snow kept on falling, its depth increased another twenty cubits, so that the sea became dry land. It was travelled by wild men and tame beasts from Khazaria, Bulgaria, and the lands of other adjacent peoples.
By divine command, during February of the same second indiction the ice divided into a great number of mountainous chunks. The force of the wind brought them down to Daphnousia and Hieron, so that they came through the Bosphoros to the city and all the way to Propontis, Abydos, and the islands, filling every shore. We ourselves were an eyewitness and, with thirty companions, went out onto one of them and played on it. The icebergs had many dead animals, both wild and domestic, on them. Anyone who wanted to could travel unhindered on dry land from Sophianai to the city and from Chrysopolis to St. Mamas or Galata. One of these icebergs was dashed against the harbour of the acropolis, and shattered it. Another mammoth one smashed against the wall and badly shook it, <435> so that the houses inside trembled along with it. It broke into three pieces, which girdled the city from Magnaura to the Bosphoros, and was taller than the walls. All the city's men, women and children could not stop staring at the icebergs, then went back home lamenting and in tears, at a loss as to what to say about this phenomenon.
In March of the same year a great many stars were seen falling from the sky, so that everyone who saw them suspected this was the end of the age. There was also a bad drought, and even springs dried up." (TURTLEDOVE, 1982: 123-124).

In a few points this text is different from the parallel text of NICEPHORUS. For instance, THEOPHANES gives his own personal recollection of the severe winter, remembering that he himself with thirty of his playmates climbed on the top of one of the icebergs that had floated down the Bosphorus (THEOPHANES, 1883: 434). This detail lacks, of course, in the passage of NICEPHORUS. Another point more serious and critical for the assessment of the trustworthiness and the acceptability of the material presented by THEOPHANES, is that of the drought which in March of the next year allegedly caused the stagnation of the springs (THEOPHANES, 1883: 435).

Table 1 The sources for the severe winter 763/64 A.D.

Byzantine	Latin
1) *Theophanis, Chronographia*	1) *Einhardi Annales*
2) *Nicephori archiepiscopi Constantinopolitani, opuscula historica*	2) *Annales Regni Francorum*
3) *Georgii Monachi, Chronicon*	3) *Annales Laureshamenses*
4) *Leonis Grammatici, Chronographia*	4) *Annales Petavianorum continuatio*
5) *Georgii Cedreni, Historiarum Compendium*	5) *Annales Iuvavenses Minores*
6) *Ioannis Zonarae, Epitome Historiarum*	6) *Annales Laurissenses*
7) *Michaelis Glyca, Annalium*	7) *Annales Laurissenses Minores*
8) *Ephraemii monachi, Imperatorum et Patriarcharum*	8) *Annales Xantenses*
9) *Constantini Lascari, Compendium Historiarum*	9) *Annales Sancti Emmerammi*
10) *Chronicon breve*	10) *Annales Alamanici*
	11) *Annales Mettenses*
	12) *Annales Breves Fuldenses Antiquissimi*
	13) *Annales Weissemburgenses*
	14) *Annales Fuldenses sive Annales Regni Francorum Orientalis ab Einhardo*
	15) *Annalium Tilianorum*
	16) *Regionis Abbatis Prumiensis Chronicon*
	17) *Annales Sangalenses Breves*
	18) *Annales Sangalenses Maiores*
	19) *Annales ex Annalibus Iuvavenisibus Antiquis Excerpti*
	20) *Annales Altahenses Maiores*
	21) *Ekkehardi Chronicon Wirziburgense*
	22) *Annales Sancti Amandi continuatio*
	23) *Annales Sangalenses Baluzii*
	24) *Annales Laubacensium continuatio*
	25) *Annales Mellicenses*
	26) *Sigeberti Chronica*
	27) *Annalista Saxo*
	28) *Annales Hildesheimenses*
	29) *Annales Guelferbytani*
	30) *Annales Nazariani*
	31) *Lamperti Annales*

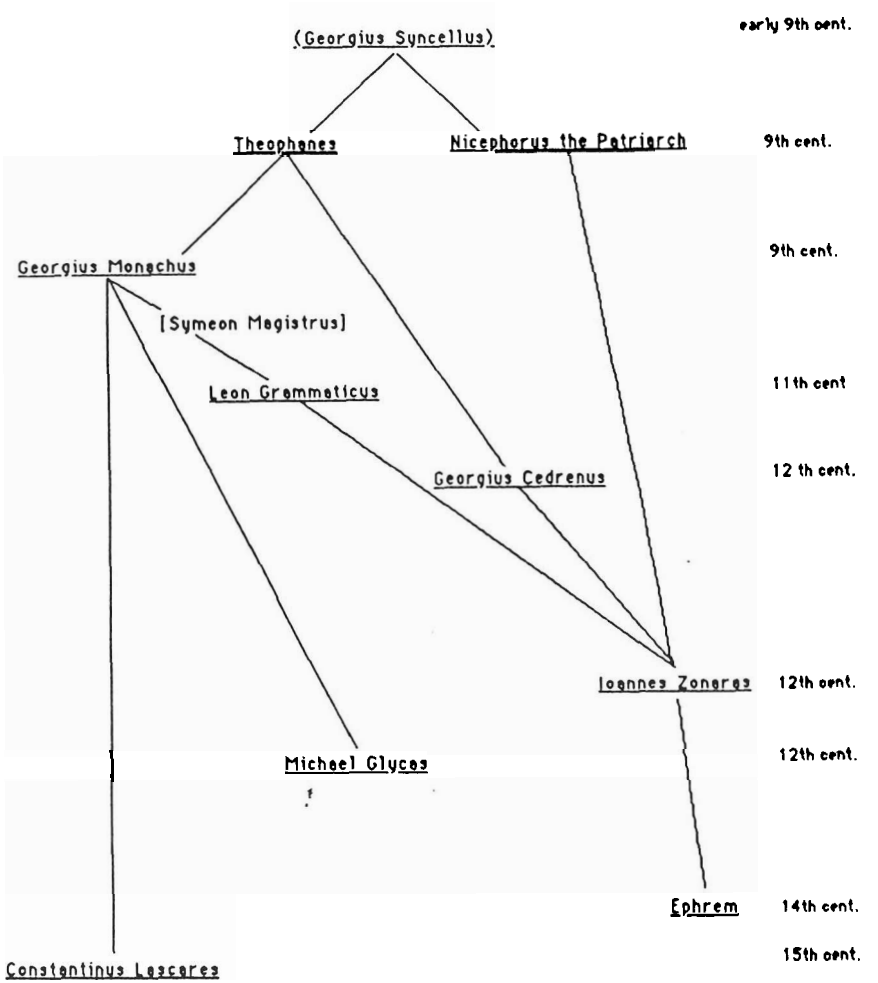

Fig. 1 Stemma of the Byzantine sources as it regards the accounts of the severe winter 763/64 A.D.

2.3 The trustworthiness of the contemporary sources. The hidden chronographer

The question is where the two chronographers could have collected their impressively identical and detailed information from. Do they both narrate some recollection of their childhood, as it is explicitly mentioned by THEOPHANES, and from which source do they supplement their material?

The key to answer these questions is hidden behind the year of birth of the two writers and in the conclusions of modern scholarship concerning the origin of the writings of THEOPHANES and NICEPHORUS and their possible common sources.

In the year of the severe winter 763/64 THEOPHANES must have been four years old and thus, it is doubtful whether a child of that age could have been allowed by his anxious mother to climb with his friends of the same age and walk on top of strange and dangerous objects such as the icebergs in front of the coasts of Constantinople (MANGO, 1978: 16). And if we accept literally THEOPHANES' personal recollection, the only answer we are able to give to the question where from he collected all those details about the geographical extent of the freezing, the dimensions of the ice or the precise depth of the snow, is that he found this information many years later, when he used some unknown oral or written sources which must have been the same as those which NICEPHORUS obviously used when he wrote his "Brevarium" (KRUMBACHER, 1958: 350; OSTROGORSKY, 1934: 2129; ALEXANDER, 1958: 159).

However, the personal recollection of the severe winter takes a new meaning if we attribute the Chronicle known as that of THEOPHANES not to THEOPHANES but to another author. Though this seems strange, it has recently been done in an absolutely persuasive and convincing way (MANGO, 1978, 1986; SPECK, 1988).

It is beyond the scope of this paper to elaborate on details about this. It should only be mentioned that a bulky dossier of notes and records - a complete chronographical material - was collected by GEORGIUS SYNCELLUS (a chronographer of the early ninth century). This material was used by NICEPHORUS, who extracted information from it and used it for the composition of this chronicle, and later it was given to THEOPHANES. It is believed now that GEORGIUS SYNCELLUS, who was close to his death in around 811, asked THEOPHANES to transcribe this dossier into a chronicle which would be the continuation of his own chronography that he expected to remain unfinished because of his imminent death. However, THEOPHANES never succeeded in making this composition. What is known as THEOPHANES' Chronography is nothing more than the text compiled by the copyist of the "archetypus" codes of his Chronography at the end of the ninth century. But no more details.

What is here interesting is the fact that the person who remembers the severe winter in THEOPHANES' passage and who stands as the author behind the relative account of NICEPHORUS is the same one: GEORGIUS SYNCELLUS.

So, the question asked about the documentary or the oral background of the evidence in the case of THEOPHANES can be transferred to that of GEORGIUS SYNCELLUS, whose trustworthiness should not be disputed, because he spent his childhood in Constantinople and we know, though not exactly, that he had used local oral and documentary evidence in order to supplement his chronographical material (HUNGER, 1978: 331 pp.)

Concerning THEOPHANES' account of the drought after March 764 A.D. (THEOPHANES, 1883: 435), we note that it sounds rather arbitrary. In his passage the drought is closely connected with a celestial phenomenon which took place shortly before and made anyone who saw it be afraid that this was the end of the age: obviously stars were seen falling from the sky; a fall of meteors.

If we consider that this account of the meteors is also found in the text of NICEPHORUS, however not related to any drought but combined with other historical events at an earlier chronological point (NICEPHORUS, 1880: 65), we can imagine that here we have to do with a false arrangement of the material on the one hand, and with the insertion of fictitious information on the other. For the author of THEOPHANES' chronicle hardly escaped from the very common motive in Byzantine chronographical writings to connect the appearance of stars, comets, and meteors to famines, pests, plagues, droughts, and similar mundane misfortunes (cp. CUMONT & BOLL, 1904: 1 50).

Let us now come back to the winter 763 and examine the information of the two basic accounts more closely. Though the assertion in the passages of THEOPHANES and NICEPHORUS that "it was bitterly cold after the beginning of October, not only in our land (Byzantine Empire) but even more so to the east, west, and north" sounds excessive, we have found a good number of Latin annals and chronicles contemporary or later to the event, originating from Central Europe, which are in agreement with the Byzantine sources and confirm them, so that the chronology of the event and the geographical dimension of the phenomenon are verified by these independent sources.

As a matter of fact, both the "*Einhardi Annales*" (1826: 145) and the "*Annales Regni Francorum*" (1950: 22) stay chronologically very close to the event and can be considered as trustworthy according to the rigourous comparative analysis of the annals and chronicles from Central Europe of the ninth to thirteenth centuries, carried out by FARMER, WIGLEY, and others (1983: 205 pp.) from the Climate Research Unit of East Anglia University.

2.4 Comment on the later accounts

Furthermore, these contemporary primary Byzantine and Latin chronicles served as sources for the later ones. Despite their minor differences, these chronicles rely on the primary sources of the ninth century. It is not the proper place here to put side by side authors' names and statements coming from various Byzantine and Latin texts in order to show that

the small differences among the later testimonies do not question the trustworthiness of the primary information and that they simply owe their existence to the manner with which each later writer used the chronographical material that he received from the anterior sources, according to his personal style, his capability of recompiling the texts he read as well as the attention he paid when he was copying them. The output of the historical-philological comparison of the Byzantine sources quoting the event is shown in table 1.

2.5 Summary of the pure data

After this analysis, a résumé of the pure data should be offered, enabling the climatologist to make any quantifications necessary for the reconstruction of past Mediterranean climate:

It should be clear from the evidence of the contemporary Byzantine sources which were verified by contemporary Latin ones that a severe winter with harsh cold set in already in October 763 A.D., not only at the northeastern parts of the Balkan peninsula but also in Central Europe. The Black Sea froze up to a distance of about 100 miles off the shores and to a depth of about 13 m. This happened along the northern coasts including the mouths of the big rivers Dnieper and Dniester, along the eastern coast from the mouth of the Sea of Azof (Kerts) to the edge of the Caucasus and along the western coasts, from the mouth of the Danube to the shores of Eastern Thrace.

The snowfall which followed the harsh cold caused the development of a new thick ice-layer above the previous one about 9 m thick. After this, the sea became a passable frozen surface in the northern and western parts of the Black Sea.

In February 764 A.D. the ice broke into large ice-drifts which were pushed by the force of the winds and the streams to the southern (obviously unfrozen) extension of the Black Sea, floating down through the Bosphorus and covering the surface of the sea between the European and the Asiatic coasts to the Marmara Sea. The cold and the snowfalls that probably followed contributed to the formation of a new frozen passable surface.

2.6 Comment on the reliability of the quantitative information of the contemporary accounts

Perhaps, we should not take the quantitative elements of the evidence word by word because Medieval chronographers are usually fond of exaggerating. Such a suspicion would be legitimate if this freezing of the Black Sea and the Bosphorus had been unique in history. However, we happen to know of about 15 cases of similar freezings from 7 to 1862 A.D. (401, 739, 763, 800, 928, 934, 1011, 1232, 1454 A.D.; MIONI, 1980), 1620, 1669, 1755, 1823, 1849, 1862 (these chronologies were provided by TCHICHATCHEF, 1964: 268 pp.). If we correlate these events to the deduction of modern climatology for the region of

the Black Sea (BORISOV, 1965: 127 pp.; Meteorological Office, 1963: 74 pp.), we should consider the quantitative information coming from the historical evidence as approximately true, provided that we attribute it to an exceptional case.

Of course, we should not forget the expected tendency of the iconophile chronographers NICEPHORUS and THEOPHANES to connect this severe winter with the "dark" political circumstances of their time, when the Iconoclast Emperor Constantine V was on the Byzantine throne (LOMBARD, 1902: 94). But the existence of this tendency obviously does not put under dispute the fact that the phenomenon took place really; although the authors may well exaggerate. The ice-drifts seem to have appeared in the Bosphorus and crashed on the walls on Constantinople, but their size or the damage they produced can have been less than what the chronographers record.

On the other hand, the details about the frozen wild and domestic animals on the icebergs should be evaluated as significant for the trustworthiness of the whole evidence, if we take into consideration that such a sight fits better to a polar or at least northern landscape than to a Mediterranean one and, as a matter of fact, it must have been unknown as visual impression to the Mediterranean man.

This severe winter was perhaps either the earliest of a series of very cold winters which indicate the development of a significantly colder climatic regime at the end of the first millennium in Europe, or an isolated climatic event as LAMB (1982: 157) observes. Anyway it did not have any effects on the economy of the period. Our sources do not let us come to any such conclusion. None the less, it is a good example to show in which way historical documentary sources of varying geographical origin can supplement each other providing simultaneous information which can be analyzed and interpreted in various manners.

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