

WILLIAM TUCKER

UNIVERSITY OF ARKANSAS AT FAYETTEVILLE

## Environmental Hazards, Natural Disasters, Economic Loss, and Mortality in Mamluk Syria<sup>1</sup>

The role of natural disasters and environmental disruptions has received considerable attention among historians of various cultures and regions over the past twenty-five years. Beginning with J. D. F. Shrewsbury's *A History of Bubonic Plague in the British Isles* and William McNeill's *Plagues and Peoples* and continuing most recently with William Jordan's study, *The Great Famine: Northern Europe in the Early Fourteenth Century* and Carol Benedict's *Bubonic Plague in Nineteenth-Century China*, scholars have examined the historical significance of such phenomena as severe weather, droughts, pest influxes, epizootics and, more importantly, famines, epidemics, earthquakes, and fires.<sup>2</sup> In addition to studies of this type, the examination of such phenomena in an historical context reflects the influence of a body of literature devoted to the classification, description, and assessment of catastrophes in recent times, perhaps best exemplified in the work of Gilbert White, R. W. Kates, and John Whittow, and also presented systematically in the journal *Disasters*.<sup>3</sup>

Aside from the plague studies of Michael Dols and Lawrence Conrad and the books and articles of Charles Melville, scholars of Near Eastern and Islamic history have paid little attention to environmental catastrophes.<sup>4</sup> In a study published

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<sup>2</sup>J. D. F. Shrewsbury, *A History of Bubonic Plague in the British Isles* (Cambridge, 1970); William McNeill, *Plagues and Peoples* (New York, 1976); William Jordan, *The Great Famine: Northern Europe in the Early Fourteenth Century* (Princeton, 1996); Carol Benedict, *Bubonic Plague in Nineteenth-Century China* (Stanford, 1996).

<sup>3</sup>Gilbert F. White, ed., *Natural Hazards: Local, National, Global* (New York, 1974); Ian Burton, Robert W. Kates, and Gilbert F. White, *The Environment as Hazard* (New York, 1978); John Whittow, *Disasters: The Anatomy of Environmental Hazards* (Athens, Georgia, 1979); *Disasters: The Journal of Disaster Studies and Management*, published by Basil Blackwell (Oxford, 1977-present).

<sup>4</sup>Michael W. Dols, *The Black Death in the Middle East* (Princeton, 1977); idem, "The Second Plague Pandemic and Its Recurrences in the Middle East: 1347-1894," *Journal of the Economic and Social History of the Orient* 22, pt. 2 (1979): 162-189; Lawrence Conrad, "The Plague in the Early Medieval Near East" (Ph.D. diss., Princeton University, 1981); idem, "Arabic Plague

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more than fifteen years ago, I tried to address this issue, albeit in a limited fashion.<sup>5</sup> The present essay constitutes an attempt to extend this research to a different locale and to provide a somewhat broader perspective on the issue. The methodology to be employed is adopted from my own 1981 article (cited in note 5) and the study of meteorological hazards by Melville referred to in note 4.

I have chosen to examine the nature and impact of disasters in Mamluk Syria with a view to providing greater insight into the various ways they affected public health, economic life, and population levels. The thesis of this study, simply stated, is that natural hazards or disasters played a significant role directly and indirectly in the livelihood and health of Syrian society as a whole, that is, not just Mamluk military or *'ulamā'* elites but within the entire social spectrum. Although certain disasters, as we shall see, were particularly destructive or deadly, for example, earthquakes and epidemics, a variety of natural dysfunctions or catastrophes visited health and financial damage upon the population. In order to understand this process, furthermore, it is imperative to examine each type of disaster with a view to determining the particular nature of the harm inflicted. Most of these phenomena have their own direct effects, but in some cases they generate other destructive events or create serious loss in an indirect, long-term fashion. Also, disaster studies, including those cited above (note 3), suggest that it is more valid to proceed inductively, analyzing the events as classes or groups in a diachronic framework so as to suggest relationships rather than simply concentrating upon one, however spectacular, event. Such a mode of analysis can also indicate the relative destructiveness of an incident. It shows clearly, for instance, the pronounced lethality of plague epidemics, famines, and severe earthquakes. On the other hand, it demonstrates that weather events can generate food crisis or famine, or even spawn mortality themselves.

The source materials utilized in this study are mainly chronicles emanating from both Syria-Palestine and Egypt. Most of these works are arranged annalistically, which has both advantages and disadvantages. From the positive side, this method of organization seems to foster an interest in recording the important "events" or

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Chronologies and Treatises: Social and Historical Factors in the Formation of a Literary Genre," *Studia Islamica* 54 (1981): 51-93; idem, "Ṭā'ūn and Wabā': Conceptions of Plague and Pestilence in Early Islam," *Journal of the Economic and Social History of the Orient* 25, pt. 3 (1982): 268-307; N. N. Ambraseys and Charles P. Melville, *A History of Persian Earthquakes* (Cambridge, 1982); N. N. Ambraseys, Charles P. Melville, and Robin D. Adams, *The Seismicity of Egypt, Arabia, and the Red Sea: A Historical Review* (Cambridge, 1994); Charles P. Melville, "Earthquakes in the History of Nishapur," *Iran* 18 (1980): 103-122; idem, "Meteorological Hazards and Disasters in Iran: A Preliminary Survey to 1950," *Iran* 22 (1984): 113-150. This latter essay is one of the finest examples of the utilization of disaster research in the study of Near Eastern history.

<sup>5</sup>William Tucker, "Natural Disasters and the Peasantry in Mamlūk Egypt," *JESHO* 24, pt. 2 (1981): 215-224.

"curiosities" of a given year and thereby encourages the inclusion of more than simple military and political affairs. On the other hand, it also results frequently in extremely terse and summary descriptions of phenomena with little detailed information about immediate effects other than the sort of "much destruction" or "many people perished" reportage. The nature of the problems in working with such material can be readily seen in the excellent remarks of Charles Melville in his *Arabic and Persian Source Material on the Historical Seismicity of Iran from the 7th to the 17th Centuries A.D.*<sup>6</sup> One might expect the necrologies in the chronicles to afford useful information with regard to disaster-caused mortality, but that does not seem to have been the case except with the plague pandemic and other instances of exceptionally lethal plague events.<sup>7</sup> Plague material, in fact, constitutes a notable exception to the problems with the volume and coverage of catastrophes; however, in view of Professor Dols's masterful contribution, I touch upon this issue only briefly in this study. Other than the chronicles and the voluminous material on plague, there are useful treatises on certain disasters, such as al-Maqrīzī's *Ighāthah al-Ummah bi-Kashf al-Ghummah* (on famines) and al-Suyūfī's *Kashf al-Salsalah 'an Waṣf al-Zalzalah* (earthquakes), but these kinds of texts are unfortunately not numerous and, in the case of al-Maqrīzī's work, the emphasis is almost entirely upon Egypt.<sup>8</sup> Presumably documents and *waqf* materials would yield information about loss through disasters, but unfortunately I have been unable to locate such materials for Syria, and regrettably the materials I have seen or analyzed (confined to data from Palestine or Egypt) have yielded much less than one would expect or hope.<sup>9</sup> Similarly, biographical dictionaries have proved to be far less helpful than might be anticipated. In the first place, they

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<sup>6</sup>Charles P. Melville, *Arabic and Persian Source Material on the Historical Seismicity of Iran from the 7th to the 17th Centuries A.D.* (Ph.D. diss., Cambridge University, 1978), 184-194.

<sup>7</sup>Dols, *Black Death*, 220-222.

<sup>8</sup>For al-Maqrīzī, we have now the excellent study and translation of Adel Allouche, *Mamluk Economics: A Study and Translation of al-Maqrīzī's Ighāthah* (Salt Lake City, 1994); al-Suyūfī *Kashf al-Salsalah 'an Waṣf al-Zalzalah* (Fez, 1971); idem, "Soyuti's Work on Earthquakes called *Kashf al-Salsalah 'an Waṣf Az-Zalzalah*, i.e., Removing the Noise from the Description of the Earthquakes . . .," trans. A. Sprenger, *Journal of the Royal Asiatic Society of Bengal* 141 (n.s. 57) (1843): 741-749.

<sup>9</sup>The important document studies of Professor Donald Little are noteworthy here, e.g., "The Significance of the *Haram* Documents for the Study of Medieval Islamic History," *Der Islam* 57 (1980): 189-217; and more recently, his "Documents Related to the Estates of a Merchant and His Wife in Late Fourteenth Century Jerusalem," *Mamlūk Studies Review* 2 (1998): 93-193. See also Huda Lutfi, *al-Quds al-Mamlūkiyya: A History of Mamlūk Jerusalem Based on the Ḥaram Documents* (Berlin, 1985), esp. 220, 223, 225, 231. For Egypt, see Carl F. Petry, "A Geniza for Mamluk Studies? Charitable Trust (*Waqf*) Documents as a Source for Economic and Social History," *MSR* 2 (1998): 51-60.

focus upon social elites and therefore afford little insight into the lives of common people, urban or rural, but also they yield minimal information about economic issues related to disaster and also contain negligible data about mortality causes except plague. Even in the case of plague, the situation is not nearly as clear-cut as one might expect, as Michael Dols's treatment of the issue showed many years ago.<sup>10</sup>

If one must rely largely upon chronicles in the study of catastrophes and natural hazards, it is at least useful to examine the evidence through comparison with details and techniques gleaned from studies of populations and areas outside the Middle East which may be blessed with more copious information. While the present investigation is technically not a work of comparative history, it does utilize where possible materials from other cultures and periods. In particular, I have found the research of scholars in East Asian history and in Early Modern European history to be invaluable. In the latter case, information based upon medical, climatic, and seismological studies have provided much greater insight into how these events unfold and what their effects, especially indirect or covert results, are.

Warfare and military operations constituted, potentially, a source of disaster in themselves. Obviously, the Mongol-Mamluk wars resulted in a number of calamitous incursions into Syria. Reuven Amitai-Preiss refers to some half dozen invasions and goes on to examine carefully the military and political aspects of these struggles.<sup>11</sup> Referring to the same sorts of events, Eliyahu Ashtor years earlier spoke of what he termed "mass flights" of people from Syria into Egypt and suggested that these migrations played a role in the slower population growth of Syria than that of Egypt in the Bahārī Mamluk period (late 1250s to 1381).<sup>12</sup> Such military action and occupation of towns or cities could produce noncombatant casualties, destruction of property (looting or burning), or the spread of epidemics (although there seems to be no evidence of plague spread in this fashion in Syria).

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<sup>10</sup>Dols, *Black Death*, 222, note 73. I have found no indication of Professor Dols's expectations being realized in later research. A number of years ago Carl Petry kindly shared with me mortality information gleaned from the biographical works consulted in his study of the Cairene 'ulamā', and I was unable to find any correlation between this material and the disaster data afforded by the chronicles; in a number of cases, in fact, the cause of death was unidentifiable. For the use of Mamluk biographical materials, one must consult Professor Petry's *The Civilian Elite of Cairo in the Later Middle Ages* (Princeton, 1981).

<sup>11</sup>Reuven Amitai-Preiss, *Mongols and Mamluks: The Mamluk-Ikhanid War, 1261-1281* (Cambridge, 1995), 1; see also chapter 8 on the second battle of Homs.

<sup>12</sup>Eliyahu Ashtor, *A Social and Economic History of the Near East in the Middle Ages* (Berkeley, 1976), 290.

Plague epidemics seem to have been spread most often by religious pilgrims or by merchants, especially maritime traders.<sup>13</sup> In point of fact, epidemics seem to have negatively affected Mamluk military strength through decreased revenues and lowered *iqtā'* values and through the disruption of military campaigns.<sup>14</sup> In any case, these issues have been discussed more fully by Professors Ashtor and Dols, and one may consult their respective works for further details.

The role of what William McNeill has referred to as "macro-parasites," that is, tribal raiders, predatory government officials, or unruly urban groups, will not be discussed here except insofar as they intensified or prolonged environmental dysfunctions.<sup>15</sup> Furthermore, one should recall the admonitions of Emmanuel Le Roy Ladurie years ago, when he cautioned against relating political change and environmental disturbance.<sup>16</sup> The concatenation of dynastic change and disasters, for instance, may work very well in an analysis of Imperial Chinese history, but any such linkage is not evident in any of the data from the medieval Near East.

Given Mamluk political and familial rivalries, I question Mounira Chapoutot-Remadi's inclusion of political factors in her otherwise excellent study of the terrible famine-epidemic cycle of 1294-1295 in Egypt.<sup>17</sup> Having examined the evidence concerning this catastrophe, it seems to me that environmental disturbance and popular response to it played a far greater role than Mamluk political concerns or factional disputes. Governmental responses to disasters appear to have been *ad hoc* and, if anything, somewhat haphazard. As will be seen in the case of famine, official aid to affected populations was indirect and variable. While Professor Boaz Shoshan's concept of the "moral economy" may be applicable in Egypt and, by extension, in Syria, the Mamluk government apparently did not see a need to establish a regular, rationalized organizational structure to address food crises or, for that matter, other hazards (see the discussion of famine relief below).<sup>18</sup>

In his *The European Miracle; Environment, Economic and Geopolitical History of Europe and Asia*, E. L. Jones divides disasters into four groups: (1) geophysical (earthquakes, volcanic eruptions, etc.); (2) climatic (floods, droughts, hurricanes, etc.); (3) biological (epidemics, epizootics, locusts); (4) social (warfare, fires,

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<sup>13</sup>Dols, *Black Death*, 53-67.

<sup>14</sup>Ibid., 190-192.

<sup>15</sup>McNeill, *Plagues*, 6-7, 138, 181, 188.

<sup>16</sup>Emmanuel Le Roy Ladurie, *Times of Feast, Times of Famine: A History of Climate since the Year 1000*, trans. B. Bray (New York, 1971).

<sup>17</sup>Mounira Chapoutot-Remadi, "Une grand crise à la fin du XIIIe siècle en Egypte," *JESHO* 24, pt. 3 (1983): 217-245.

<sup>18</sup>Boaz Shoshan, "Grain Riots and the 'Moral Economy': Cairo, 1350-1517," *Journal of Interdisciplinary History* 10, pt. 3 (Winter 1980): 459-478.

etc.).<sup>19</sup> In the present study, emphasis will be placed upon the first three of these categories in the most common order: climatic, biological, or social (depending upon one's classification of famine), biological (epidemics), and geophysical (earthquakes). Having established a general framework for the following analysis, it is time to examine generically the various disasters which affected Mamluk Syria and in the process to contrast these where feasible with similar phenomena in Egypt, which was, after all, the locus of power in the Mamluk realm.

Although different from Egypt in climate and topography, Syria too suffered from a number of the same weather problems that plagued Egypt. Damaging wind storms, sometimes accompanied by sand, wrought destruction at various times between 1260 and 1516. In 1315 houses and goods in Tripoli were damaged by severe winds, which were followed by rain and cold.<sup>20</sup> Three years later the Tripoli area was hit again by wind, waterspouts, and hail.<sup>21</sup> In the next year, 1319-1320, violent wind destroyed many houses in Damascus, uprooting trees and burying many people in their houses. The same storm system apparently hit Aleppo with wind and sand.<sup>22</sup> Damascus experienced substantial damage and injury or death in later wind storms also; 1382 or 1383 saw severe damage to trees and houses.<sup>23</sup> In 1441-1442 the city was buffeted by strong winds for four days with the destruction of houses and trees, and damage to the Umayyad Mosque. The same storm ravaged crops and trees at Tripoli, Latakia, Hamah, Aleppo, and Homs.<sup>24</sup> Again, in 1490, violent winds devastated trees and houses in Damascus.<sup>25</sup> Aleppo also suffered from wind storms in 1317-1318. In the account preserved in al-Mufaḍḍal's chronicle, the terrifying storm is described as having been accompanied by dust, hail, thunder, and lightning. Just to the west of the city, wind destroyed hundreds of oaks, olive trees, and vines. People, domestic and wild animals, as well as birds, were killed. The people, we are told, prayed for God's mercy.<sup>26</sup> Obviously, one sees in these events substantial economic loss in terms of homes and livelihood (crops and animals). Rural dwellers were hurt by loss of animals and valuable trees, while urban residents who escaped collapsed

<sup>19</sup>E. L. Jones, *The European Miracle: Environment, Economic, and Geopolitical History of Europe and Asia* (Cambridge, 1981), 23-41.

<sup>20</sup>Al-Duwayhī, "Tārīkh al-Azmināt," *al-Mashriq* 44 (1951): 169-170.

<sup>21</sup>Sibt ibn al-'Ajāmī, "Les trésors d'or," trans. Jean Sauvaget (Beirut, 1950), 9.

<sup>22</sup>Al-'Aynī, *Ta' rīkh al-Badr*, British Library, MS Or. Add. 22360, fol. 8a.

<sup>23</sup>Al-Sakhāwī, *Dhayl Duwal al-Islām*, Bodleian Library, Arabic MS Marsh 508, fol. 87a.

<sup>24</sup>Ibn Ḥajar al-'Asqalānī, *Inbā' al-Ghumr bi-Abnā' al-'Umr* (Hyderabad, 1976), 9:13; al-Jawharī, *Nuzhat al-Nufūs wa-al-Abdān fī Ta' rīkh al-Zamān* (Cairo, 1973), 3:401-402.

<sup>25</sup>Ibn Ṭūlūn, *Mufākahat al-Khillān fī Ḥawādith al-Zamān* (Cairo, 1967), 1:67.

<sup>26</sup>Al-Mufaddal ibn Abī al-Fadā'il, *Ägypten und Syrien zwischen 1317 und 1341* (Freiburg, 1973), 1-2.

dwellings incurred substantial property loss as well as increased prices for scarce commodities or goods. Clearly, these storms were most devastating to the infrastructure and to the agricultural macroeconomy (this latter term used here in the sense of economic sectors). Also, one sees in the report of the Aleppo event of 1317-1318 one of the rare glimpses of psychological response to catastrophe in Syria, not surprisingly, a religiously based reaction. Disasters may well have stimulated heightened religious consciousness, but the references are too sparse to warrant any confident statements in this respect.

Hail, snow, and severe cold also caused hardship for producers and/or merchants of crops and commodities. In 1274, for example, severe rain and hail hit Damascus, and al-Birzālī reports that the apricot crop in the Ghūṭah suffered major loss.<sup>27</sup> In 1292-1293 Syria experienced severe cold and wet weather. Baalbak was hit by rain and snow, and it is reported that the Syrian pilgrimage caravan lost pilgrims to the terrible cold and rains. The intense cold of this time also made itself felt at Damascus, where rain and snow compounded the suffering.<sup>28</sup> Six years later (1298-1299) Damascus was hit by a snow storm which left the ground covered for fifteen days.<sup>29</sup> Snow and cold then destroyed fruit crops in 1307-1308.<sup>30</sup> Syria was famous for its fruit crops and exported these to other areas, for example, Iraq.<sup>31</sup> Damage of the sort mentioned above would thus be expected to disrupt regional trade and, thereby, adversely affect the Syrian mercantile economy at least in the short run.

The fourteenth century saw a number of episodes of cold, ice, or snow. In 1377 there were hail and ice storms throughout the region, in which olive trees were damaged or destroyed and in which people and animals perished. Villages were buried under a cover of snow.<sup>32</sup> Snow in 1345 blocked roads, killing travellers, and domestic and wild animals perished also. Damascus was hard hit in the storm, and it was said that people had not seen the like of it before.<sup>33</sup> Aleppo experienced

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<sup>27</sup> Al-Birzālī *al-Muqtafā' li-Ta'rīkh al-Shaykh Shihāb al-Dīn Abī Shāmah*, Arab League, MS 507, fol. 56a.

<sup>28</sup> Al-Jazarī, *Chronique des Damas*, trans. Jean Sauvaget (Paris, 1949), 27.

<sup>29</sup> Al-Jazarī, *Jawāhir al-Sulūk fī al-Khulafā' wa-al-Mulūk*, Bibliothèque Nationale, MS arabe 6739, fol. 268a.

<sup>30</sup> Al-Duwayhī, "Azminat," 163.

<sup>31</sup> Eli Ashtor, "The Diet of the Salaried Classes in the Medieval Near East," *Journal of Asian History* 4 (1970), 6.

<sup>32</sup> Ibn Ḥabīb, *Tadhkirat al-Nabīh fī Ayyām al-Manṣūr wa-Banīh*, British Library, MS Or. Add. 7335, fols. 40a-b.

<sup>33</sup> Al-'Aynī, *al-Badr*, British Library, MS 22360, fol. 49a; al-Dhahabī, *Kitāb al-'Abr*, Bibliothèque Nationale, MS arabe 5819, fol. 148b.

considerable snowfall in 1348, and bad crops were the result.<sup>34</sup> Syria again was the scene of snow and ice in 1352, 1363, 1399, and 1400. The freeze of 1363 was noteworthy because the Euphrates and other rivers froze, allowing travellers to walk across them.<sup>35</sup> The 1399 event consisted largely of frost, which spread in most parts of the area and destroyed walnuts, almonds, and apricots.<sup>36</sup> The very next year, the Biqā' valley and the mountains north of Damascus received snow, an unusual occurrence according to Ibn Qāḍī Shuhbah.<sup>37</sup> The fifteenth century seems to have been easier, although Syria had significant snow in 1496, and Palestine was very hard hit with snow accumulations in 1499. In the latter case, paths and streets were blocked in Jerusalem, the snow becoming hard frozen and lasting for almost three weeks.<sup>38</sup>

The episodes of freezing cold and precipitation were severe blows to the affected populations. Agricultural commodities were damaged or destroyed, and commercial travel was disrupted by the snow storms. People were stranded and, at times, killed by the weather. Although there seems to be no way to prove it, one may also conjecture that some losses resulted from hypothermia, or what John Post has called "accident hypothermia." As Post points out, sharp temperature changes are also known to occasion deaths from pneumonia, bronchitis, and arteriosclerotic heart disease.<sup>39</sup> It is interesting to note here that the 1496 storm in Damascus was associated not only with broken or damaged trees but also with the increased costliness of badly needed firewood.<sup>40</sup> Sickness or death stemming from these episodes clearly reduced affected populations in the short term and probably contributed to the population decline evident throughout the Burjī period (1382-1517).<sup>41</sup>

Heavy rains and floods appear to have been far more common and more destructive in Mamluk Syria. Damaging rains and/or floods hit Syria some two dozen times in the period between 1269 and 1477. Damascus experienced the greatest number of these, but that may represent the geographical bias of the chroniclers. In 1269 Damascus was hit by a great flood which carried away

<sup>34</sup>Sibt ibn al-'Ajamī, "Trésors," 10.

<sup>35</sup>Al-Maqrīzī, *Kitāb al-Sulūk li-Ma'rifat Duwal al-Mulūk* (Cairo, 1970), 3:1:77.

<sup>36</sup>Ibn Qāḍī Shuhbah, *Dhayl 'alá Ta'rīkh al-Islām* (Damascus, 1977), 1:613.

<sup>37</sup>Ibid., 612, 654.

<sup>38</sup>Al-'Ulaymī, *al-Uns al-Jalīl bi-Ta'rīkh al-Quds wa-al-Khalīl*, Bibliothèque Nationale, MS arabe 1671, fols. 401-402.

<sup>39</sup>John Post, *Food Shortage, Climatic Variability, and Epidemic Disease in Preindustrial Europe* (Ithaca, New York, 1985) 202-207.

<sup>40</sup>Ibn Ṭūlūn, *Mufākahat al-Khillān*, 1:134-135.

<sup>41</sup>Ashtor, *Social and Economic History*, 302-305.



houses, animals, and goods. Trees were uprooted, bridges were destroyed, and many horses and camels drowned. The loss of human life was also said to have been severe.<sup>42</sup> The city faced virtually the same ordeal in 1282, 1317, 1319, 1326, 1377, 1382, and on still other occasions. The flood of 1317 is reported to have destroyed 895 houses, eleven mills, seventeen ovens, forty gardens, twenty-one mosques, and five *madrāsahs*. A large number of men, women, and children drowned, particularly in the baths and the mosque. Also, many markets were ruined by the flood waters.<sup>43</sup> The flood of 1326 resulted from rains in the Euphrates region and is reported to have triggered an epidemic which sickened many Damascenes.<sup>44</sup> Here again one sees economic loss, destruction, and increased morbidity (susceptibility to disease), indeed, outright mortality, associated with weather fluctuations. One can also see here with respect to the flood-caused epidemic a case of one disaster generating another.

The reverse side of the coin was, of course, the occurrence of damaging or severe drought. Drought perhaps worked more slowly in its destructiveness, but it too served to bring on crises not only in economic life, but also, and of greater import, in food consumption and public health. In 1294 Syria endured a severe drought, and eventually prices rose and famine ensued. This crisis situation intensified in the next two years, and Syria was the scene of serious famine and epidemic mortality.<sup>45</sup> During 1295 things reached such a pass that the *qādī al-quḍāh* in Damascus recited the *Ṣaḥīḥ* of al-Bukhārī from the pulpit of the Umayyad Mosque.<sup>46</sup> Drought losses, then, more often than not created shortages or full-blown famine conditions and, thus, touched health issues directly. Here again, one sees a causal relationship between one catastrophe and another.

Locust infestations and epizootics also adversely affected food supplies and economic activity. Locust invasions struck Syria on a number of occasions in the fourteenth century. Destruction of crops, plants, and trees occurred during the

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<sup>42</sup> Baybars al-Manṣūrī, *Mukhtār al-Akḥbār* (Cairo, 1993), 45-46; Ibn al-Dawādārī, *Die Chronik des Ibn al-Dawādārī* (Freiburg, 1971), 8:160; Ibn Ḥabīb, *Durrat al-Aslāk fī Dawlat al-Atrāk*, Bibliothèque Nationale, MS arabe 1719, fol. 32a; al-Nuwayrī, *Nihāyat al-Arab fī Funūn al-Adab* (Cairo, 1990), 30:176-177.

<sup>43</sup> Abū al-Fidā', *The Memoirs of a Syrian Prince: Abū al-Fidā', Sultan of Hamāh (672-732/1273-1331)*, trans. P. M. Holt (Wiesbaden, 1983), 73; al-Duwayhī, "Azminat," 170; Sibṭ ibn al-'Ajamī, "Trésors" II (Beirut, 1950), 150.

<sup>44</sup> Al-Maqrīzī, *al-Sulūk* II, pt. 1 (Cairo, 1956), 275.

<sup>45</sup> Al-Yūnīnī, *Continuation of Mir'āt al-Zamān*, British Library, MS Or. Add. 25728, fol. 89a; al-Jazarī, *Chronique*, 47; al-Nuwayrī, *Nihāyat* 31 (Cairo, 1992), 286.

<sup>46</sup> Al-Nuwayrī, *Nihāyat*, Leiden MS in Shah Elham, *Kitbuġa und Lagīn: Studien zur Mamluken-Geschichte nach Baibars al-Mansūrī und Nuwayrī* (Freiburg im Breisgau, 1977), 48 of the Arabic text.

infestation of 1301.<sup>47</sup> Al-Maqrīzī reports that the locust attack of 1365 led to high prices and, eventually, an epidemic.<sup>48</sup> Other episodes occurred in 1370 and 1402. Epizootics, while not as common, played their own negative role in Syria; for example, many horses died in an epidemic in 1431.<sup>49</sup> Not surprisingly, of course, the great plague pandemic of 1347-1349 devastated the animal population as well as the human one. As Michael Dols pointed out in his classic study of the great plague, the loss of animals hurt agricultural production badly.<sup>50</sup> Epizootics, as noted in my *JESHO* study, were a serious matter because animals were an important form of fixed capital and especially significant as analogues to machines and power sources in modern societies.<sup>51</sup>

Serious fires were another scourge for the population of late medieval Syria, particularly urban dwellers. In 1281 fire damaged mosques in Damascus, destroying in the process a number of markets, for example, those of the feltmakers and booksellers.<sup>52</sup> Merchants lost much property in a fire which hit Ḥamāh in 1335.<sup>53</sup> Two hundred and fifty shops burned in the same city.<sup>54</sup> These instances could be multiplied, but the information is invariably the same: merchants incurred severe loss of goods, while the *'ulamā'* and the poor were hard hit by the destruction of mosques and *waqf* properties. The ordinary citizens also lost their houses in some of these conflagrations, for example, in that of 1459.<sup>55</sup>

In the final analysis, of course, the three most devastating types of catastrophes in the medieval Islamic world were famine, epidemic disease, and destructive earthquakes. The remainder of this paper will be devoted to an examination of the morphology and effects of these major disasters. In view of the societal dislocation, stress, and mortality created by famine, it is surprising to note how little has been published about such subsistence crises in the medieval Near East. Some years

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<sup>47</sup>Ibn Ḥabīb, *Durrat al-Aslāk*, Bibliothèque Nationale, MS arabe 1720, fol. 135b; al-Maqrīzī, *al-Sulūk* 1:3:923; al-Sakhāwī, *Dhayl Duwal al-Islām* (Hyderabad, 1337), 2:160; al-Yūnīnī, *Dhayl*, as cited in Li Guo, *Early Mamluk Syrian Historiography: Al-Yūnīnī's Dhayl Mir'āt al-zamān* (Leiden, 1998), 1:207.

<sup>48</sup>Al-Maqrīzī, *al-Sulūk*, 3:1:92.

<sup>49</sup>Ibn Ḥajar al-'Asqalānī, *Inbā' al-Ghumr*, Bibliothèque Nationale, MS arabe 1602, vol. 2, fol. 59b.

<sup>50</sup>Dols, *Black Death*, 158-160.

<sup>51</sup>Tucker, "Disasters and Peasantry," 220.

<sup>52</sup>Ibn Ḥabīb, *Durrat*, Bibliothèque Nationale, MS arabe 9, fol. 52a; al-Maqrīzī, *al-Sulūk*, 1:3:709; al-Sakhāwī, *Dhayl* (Hyderabad), 2:142.

<sup>53</sup>Al-Dhahabī, *Kitāb al-'Abr*, Bibliothèque Nationale, MS arabe 1469, fol. 146a.

<sup>54</sup>Ibn al-'Imād, *Shadhārat al-Dhahab fī Akhbār min Dhahab* (Beirut, 1966), 6:109.

<sup>55</sup>Ibn Taghārī Birdī, *Ḥawādith al-Duhūr fī Madā al-Ayyām wa-al-Shuhūr* (Berkeley, 1930-31), 8:2:247.

ago, I undertook a brief, theoretical study of this subject, and this work, supplemented by considerably more recent examination of famines in other cultures, will serve as the basis of this discussion.<sup>56</sup>

Mamluk Syria appears to have been much more fortunate than Egypt when it came to food shortage and hunger. In the first place, the Syrians did not have to rely upon the vagaries of the Nile. Syrian agriculture benefitted from a more regular water regime based upon annual rain and snow. In spite of this, Syria itself suffered from around twenty-five famine or food crises during the Mamluk era.<sup>57</sup> Such crises had a variety of causes, although they usually began with a drastic rise of cereal prices and quickly escalated to the inability of people to afford or even to find basic foodstuffs. As noted above, the great famine-epidemic crisis of 1294-1296 began with a severe drought within Syria. Hot winds and drought also provoked famine conditions in Syria in 1317 and 1397.<sup>58</sup> A locust invasion in 1323 led to high prices and shortages, although in this case grain was imported through Beirut and Tripoli in order to offset the crisis.<sup>59</sup> Crops in the Ḥawrān were "ruined" in 1347 resulting in famine in that region.<sup>60</sup> From other sources, one may surmise that snow and cold were the culprits. Food shortages and/or famines were at times generated or exacerbated by hoarding on the part of merchants or even the Mamluks themselves.<sup>61</sup> It was also possible, as in the year 1372-1373, that migration of people into an area might stimulate food crises.<sup>62</sup> Migration was dangerous on another count, since it could lead to disease epidemics in the migrants' destinations.<sup>63</sup>

Once the famine or dearth had begun, mortality due to starvation was the most obvious result. In the great crisis of 1295, people died of starvation along the

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<sup>56</sup>Tucker, "The Effects of Famine in the Medieval Islamic World," paper presented at the Annual Meeting of the Middle East Studies Association, Seattle, November, 1981.

<sup>57</sup>I have tabulated instances of famine or food crises in Syria and Palestine occurring in the following *hijrah* years: 660, 694-696, 724, 742-743, 765, 771, 775-777, 790, 798-800, 818-819, 825, 827, 832-833, 835, 865, 870-871, 873, 882; Tucker, "Famines," 19-24.

<sup>58</sup>Al-Duwayhī, "Azminat," 170; Ibn Qāḍī Shuhbah, *Dhayl*, Bibliothèque Nationale MS arabe 1599, vol. 2, fol. 130b.

<sup>59</sup>Al-Maqrīzī, *al-Sulūk*, 2:1:254.

<sup>60</sup>Ibn Qāḍī Shuhbah, *Dhayl*, MS arabe 1598, vol. 1, fol. 84a.

<sup>61</sup>Ira M. Lapidus, *Muslim Cities in the Later Middle Ages* (Cambridge, Mass., 1967), 51-55.

<sup>62</sup>Ibn Ṭūlūn, *Les Gouverneurs de Damas sous les Mamlouks et les premiers Ottomans (658-1156/1260-1744)*, *Annales d'Ibn Ṭūlūn*, trans. Henri Laoust (Damascus, 1952), 12.

<sup>63</sup>John Walter and Roger Schofield, "Famine, Disease, and Crisis Mortality in Early Modern Society," *Famine, Disease, and the Social Order in Early Modern Society* (Cambridge, 1989), 27-28.

roads.<sup>64</sup> In 1375, famine initially killed "the frail," but eventually the mortality became more generalized.<sup>65</sup> Needless to say, such occurrences seriously disrupted all forms of economic life, especially commerce and agriculture. Sustained hunger at the very least impairs work and productivity. As Sara Millman and Robert Kates have pointed out in their essay "Toward Understanding Hunger," manual work is hampered, and the ability to sustain physical effort is lessened.<sup>66</sup> Labor productivity was in all probability adversely affected by famine but, unfortunately, it is not possible to measure this or the economic loss related to it.

Famine and severe food deprivation affect populations in another direct and often lethal fashion. Starving populations at times resort to eating whatever is to hand, regardless of its repulsiveness or toxicity. In 1372-1373, for instance, Ibn Ṭūlūn reports that people in Aleppo were reduced to eating dogs and even carcasses.<sup>67</sup> Similar reports are available for the year 1375.<sup>68</sup> Similar reports are numerous for corresponding events in other societies. Desperate measures were resorted to in a Chinese famine of 1641.<sup>69</sup> The same situation was to be found in the terrible Russian famine of 1230, where people are reported to have eaten leaves, cats, and dogs.<sup>70</sup> Diets of this sort obviously gave ample cause for death from any number of toxic organisms.

Clearly the most macabre and intense reaction to famine was resort to cannibalism. Although it appears that instances of this may not have been as common in Syria as in Egypt, we do have evidence of such behavior. The terrible crisis of 1374-1375 in Aleppo gave rise to acts of cannibalism, and the same thing is said to have happened again the next year.<sup>71</sup> Similar reports come from the earlier famine-epidemic cycle of 1294-1296.<sup>72</sup> Ironically, comparable accounts

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<sup>64</sup> Al-Duwayhī, "Azminat," 155.

<sup>65</sup> Ibn Ḥabīb, *Durrat al-Aslāk*, Bodleian Library, Arabic MS Marsh 319, fol. 127b.

<sup>66</sup> Sara Millman and Robert Kates, "Toward Understanding Hunger," *Hunger in History*, ed. Lucile Newman (Oxford, 1990), 16.

<sup>67</sup> Ibn Ṭūlūn, *Gouverners*, Laoust, 12.

<sup>68</sup> Al-Maqrīzī, *al-Sulūk*, 3:1:256.

<sup>69</sup> Helen Dunstan, "The Late Ming Epidemics: A Preliminary Survey," *Ch'ing-shih Wen-t'i* 3, no. 3 (Nov., 1975), 12-13.

<sup>70</sup> Arcadius Kahan, "Natural Calamities and Their Effect upon the Food Supply in Russia"\* [An Introduction to a Catalogue], in *Jahrbücher für Geschichte Osteuropas*, ed. Fritz Epstein (Wiesbaden, 1968), 368.

<sup>71</sup> Ibn al-'Imād, *Shadhārat* 6:250; Ibn Qādī Shuhbah, *Dhayl*, Bibliothèque Nationale, MS arabe 1598, fol. 236a.

<sup>72</sup> Ibn Ḥabīb, *Durrat al-Aslāk*, Bibliothèque Nationale, MS arabe 1720, vol. 2, fols. 111-112.

exist for the terrible Syrian famine of 1915-1918.<sup>73</sup> Numerous descriptions of such behavior come from other parts of the world at various times. Cannibalism is reported to have occurred in terrible famines in medieval Poland and Italy.<sup>74</sup> Dunstan points to instances of the same sort occurring during the Chinese famine of 1641.<sup>75</sup> In his recent book on early fourteenth-century European famines, William Jordan has cited allegations of cannibalism being practiced in England and Eastern Europe during the years 1315 to 1317. He goes on to say that most recent historians have tended to regard such reports as a literary topos, while some have suggested that these accounts are a signal to the reader of the emotional stress of famine conditions.<sup>76</sup> My own research indicates to me that neither of these explanations is satisfactory. It is hard to sustain the thesis that events reported in such strikingly similar fashions from different cultures at different times are mere literary devices. Even allowing for exaggeration, it is perfectly plausible to think that horrible stress and desperation drove people to commit the unthinkable.

Such behavioral deviation was bound to have an impact upon the society experiencing it. As I have written elsewhere, "Medieval Islamic society placed great value upon familial relationships, community solidarity, and hallowed and predictable modes of behavior or interaction."<sup>77</sup> Such activities as cannibalism can only have undermined social and community cohesiveness and identity.

Famines had other more indirect but equally damaging effects upon public health and demography. For some years now a debate about the relationship between subsistence crises and epidemic disease have divided the scholarly community. Scholars such as Ann Carmichael (Indiana University), Roger Schofield (Cambridge University), and the Italian demographer Massimo Livi-Bacci have questioned the "synergism" concept linking disease and the nutritional profile of a given "host."<sup>78</sup>

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<sup>73</sup>I owe this information to the article of my colleague, Professor Linda Schilcher: L. Schatkowski Schilcher, "The Famine of 1915-18 in Greater Syria," *Problems of the Modern Middle East in Historical Perspective: Essays in Honour of Albert Hourani*, ed. John Spagnolo (Reading, 1992), 231.

<sup>74</sup>Piero Camporesi, *Bread of Dreams: Food and Fantasy in Early Modern Europe*, trans. David Gentilcore (Chicago, 1989), 87.

<sup>75</sup>Dunstan, "Ming Epidemics," 12.

<sup>76</sup>Jordan, *The Great Famine*, 148-149.

<sup>77</sup>Tucker, "Famine," 6.

<sup>78</sup>Ann Carmichael, "Infection, Hidden Hunger, and History," *Hunger and History* (Cambridge, 1983), 51-66; Roger Schofield, "The Impact of Scarcity and Plenty on Population Change in England, 1541-1871," *ibid.*, 67-92; Massimo Livi-Bacci, *Population and Nutrition: An Essay on European Demographic History* (Cambridge, 1991), esp. chaps. 2-3.

On the other side, investigators ranging from health professionals such as Carl E. Taylor (Johns Hopkins University) to such medical historians as Thomas McKeown (University of Birmingham) support the proposition that nutritional levels are directly related to susceptibility to epidemic disease.<sup>79</sup> The evidence forthcoming from medieval Near Eastern authors would seem to support the latter argument. The data show that while epidemics could and did occur without preceding famines, nearly one-third of the famines recorded were followed by epidemics of some severity. In virtually all cases, the chroniclers make explicit linkages between the two phenomena. Famines were followed by epidemics in Mamluk Syria during the years 1294-1295, 1341-1342, 1347, 1369, 1373-1374, 1375, 1421, and 1468 in Palestine.<sup>80</sup>

Parenthetically, it should be noted that famine may have been allowed to worsen in some cases due to hoarding or manipulation of whatever existing stocks there were.<sup>81</sup> In fact, one may argue that it is here that we see one of the few plausible linkages between catastrophes and political life in Mamluk Syria. Although Lapidus and Allouche speak of Mamluk sultans providing grain relief in bad times, in point of fact the evidence does not show that there was a regular institutional or rationalized mechanism for food relief. In this sense, one may argue that this factor, combined with the food hoarding by Mamluk amirs and, at times, by the sultan himself, intensified or even brought on food crises.<sup>82</sup> In this case, politics can be seen as stimulating a crisis. In China, in contrast, by the eighteenth century the imperial government had taken proactive measures to deal with famine. Central and local granaries were maintained in order to combat famine. Furthermore, in times of crisis the imperial administration used state funds to purchase foodstuffs outside the stricken area and then to transport the grain to local distribution areas. On other occasions, money was distributed directly to the affected population, and in the case of the desperate, officials were authorized to give food or money on the spot.<sup>83</sup>

Famine and subsistence crises can affect demography in important ways, and one may conjecture that they did so in the medieval Near East, including Mamluk

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<sup>79</sup>Carl E. Taylor, "Synergy among Mass Infections, Famines, and Poverty," *Hunger and History*, 247-284; Thomas McKeown, "Food, Infection, and Population," conference paper presented at Bellagio (June 22-July 2, 1982), 1-32, paper now located in the Library of the Cambridge Group for the Study of the History of Population and Social Structure, Trumpington St., Cambridge, England.

<sup>80</sup>Tucker, "Famines," 30-31, note 19.

<sup>81</sup>Lapidus, *Muslim Cities*, 52-57.

<sup>82</sup>Lapidus, *Muslim Cities*, 51-55; Allouche, *Mamluk Economics*, 14.

<sup>83</sup>Pierre-Etienne Will, *Bureaucracy and Famine in Eighteenth Century China*, trans. Elborg Forster (Stanford, 1990), 130, 282-289.

Syria. Modern research indicates that nutritional deficiency and stress play a major role in male and female infertility. As Rose Frisch (Dept. of Population Sciences and Center for Population Studies, Harvard University) pointed out years ago, undernourished females have a high frequency of irregular and anovulatory cycles, and "menstruation stops completely if undernutrition is severe." Furthermore during pregnancy undernourished women have a higher probability of miscarriage or stillbirth, and even if they deliver successfully, their lactation amenorrhea is longer, thus leading to a longer birth interval.<sup>84</sup>

In the case of adult males, sperm count is reduced, and "such children as are born tend to be underweight and of reduced viability."<sup>85</sup> Research also shows that stress conditions trigger pituitary hormonal changes in both men and women, leading to at least temporary infertility.<sup>86</sup> Were these conditions present in Mamluk Syria? Presumably, if Syrians were of the same biological makeup as other populations, the response would have to be in the affirmative.

The greatest killer among all the disasters in Mamluk Syria as elsewhere was epidemic disease. The area was hard hit by epidemics at least forty-one times just in the period after the pandemic of 1347-1348.<sup>87</sup> Of greater import, perhaps, is the tremendous loss incurred during the pandemic of 1347-1348. Michael Dols has provided the definitive study of this catastrophe, and there is neither time nor need to recount fully the macabre results. Suffice it to say that in Damascus alone one to two thousand people are said to have died daily during the peak period. Dols suggests that the Damascene population decline amounted to more than thirty percent.<sup>88</sup> Elsewhere, after looking at figures for other Syrian cities, he estimates that the Syrian population as a whole was reduced by one-third.<sup>89</sup> One must also note that Dols and that Shoshan in his table both indicate that plague recurrences were sufficiently numerous and frequent that the general Middle Eastern population was unable to recover successfully from the Black Death.<sup>90</sup>

Unfortunately, most of Dols's research centers upon Egypt, so it is difficult to determine the range of Syrian economic loss from the pandemic. Presumably, the

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<sup>84</sup>Rose E. Frisch, "Population, Food Intake, and Fertility," *Science* 199 (6 Jan., 1978), 22.

<sup>85</sup>J. P. W. Rivers, "The Nutritional Biology of Famine," *Famine*, ed. G. A. Harrison (Oxford, 1988), 79; Robert Dirks, "Famine and Disease," in *The Cambridge World History of Human Disease*, ed. Kenneth Kiple (Cambridge, 1994), 157-163.

<sup>86</sup>J. P. Henry and P. M. Stephens, *Stress, Health, and the Social Environment: A Sociobiologic Approach to Medicine* (New York, 1977), 12.

<sup>87</sup>See the valuable table in Boaz Shoshan's "Notes sur les epidemies de peste in Egypte," *Annales de démographie historique*, Société de Démographie Historique (Paris, 1981), 401-403.

<sup>88</sup>Dols, *Black Death*, 218-220.

<sup>89</sup>*Ibid.*, 220.

<sup>90</sup>Dols, *Black Death*, 223; Shoshan, "Epidemies," 401-403.

loss of people and animals in Syria badly hampered commercial exchange, labor, and production just as happened in neighboring Egypt. It must also be remembered that non-plague epidemics generated significant population loss. For instance, an epidemic of something other than plague killed many in Aleppo in 1422—supposedly as many as seventy thousand.<sup>91</sup> What this and other non-plague diseases were is virtually impossible to say; Lawrence Conrad has indicated some of the issues surrounding the Arabic terms *wabā'* and *ṭā'ūn*, generally used to designate epidemic and plague, respectively.<sup>92</sup> The information afforded in the chronicles seems much less precise than, for instance, terms for epidemic diseases in early modern Japan.<sup>93</sup> Clearly, however, plague was not the only epidemic disease that troubled Mamluk Syria. As indicated previously, disease could be sparked by severe or changeable weather or by malnutrition.

Whatever the nature of the epidemic, the results were largely the same. Civic life was disrupted. The Mamluk elite and army were hard hit,<sup>94</sup> and continuation of public security and order became problematic. Normal family and community life were disrupted by the frequently overwhelming mortality. Mass burials and similar departures from the norm placed great strain upon medieval Islamic societies, including that of Mamluk Syria (especially the terrible plague of 1429).<sup>95</sup>

If famine and epidemics were lethal events in the medieval Islamic world, earthquakes were at times also lethal and always terrifying phenomena. The damage and destruction were immediately apparent and, therefore, probably a much greater stressor. In 1293 there were severe earthquakes in Palestine at such places as al-Ramlah and al-Ludd. Fortifications in al-Karak were damaged, and three villages in the vicinity were destroyed.<sup>96</sup> A terrible earthquake struck both Syria and Egypt in 1302-1303, destroying houses and killing many.<sup>97</sup> In January of 1343 the town

<sup>91</sup>Sibṭ ibn al-‘Ajamī, “Trésors,” 2:11.

<sup>92</sup>Lawrence I. Conrad, “Ṭā‘ūn and Wabā’ : Conceptions of Plague and Pestilence in Early Islam,” *JESHO* 25, pt. 3, 268-307.

<sup>93</sup>Ann B. Jannetta, *Epidemics and Mortality in Early Modern Japan* (Princeton, 1987).

<sup>94</sup>Dols, *Black Death*, 154.

<sup>95</sup>Al-Jawharī, *Nuzhat al-Nufūs* (Cairo, 1973), 3:186-190; al-‘Aynī, *Iqd al-Jumān*, Dār al-Kutub, MS Ta’rīkh 8203 H, fol. 326; Ibn Ḥajar, *Inbā’ al-Ghumr*, British Library MS, Or. Add. 7321, fols. 293b-294a.

<sup>96</sup>Al-Jazarī, *Chronique*, 83; al-Suyūfī “Soyuti’s Work on Earthquakes, called Kashf al-Salsalah ‘an Waṣf Az-Zalzalah, i.e., Removing the Noise from the Description of the Earthquakes . . .,” 748.

<sup>97</sup>Ibn Ḥabīb, *Durrat al-Aslāk*, Bibliothèque Nationale, MS arabe 1719, fol. 116b; Ibn al-Shihnah, *Rawdāt al-Manāzib*, British Library MS, Or. Add. 23336, fol. 117a; al-Muqrī, *Nathr al-Jumān*, Chester Beatty, MS 4113, fols. 65a-b.



of al-Manbij in northwest Syria was ruined and 5,700 people killed there.<sup>98</sup> Information on other severe earthquakes in Syria during this period can be gleaned from the pages of what is probably the definitive catalogue, the Paris dissertation of Mustapha Anwar Taher.<sup>99</sup> The results were frequently the same: numerous buildings ruined, fortifications leveled, and people dead in the rubble. Here, again, although architects and builders may have benefited, economic losses were severe for property owners, *'ulamā'* and those associated with mosques and *waqf* properties, and for commercial interests losing shops or goods. Furthermore, one can surmise that governments needing to repair fortifications, walls, and other similar structures, had to expend extra revenues which were probably passed on to taxpayers.

The earthquake risk for Syria (including the Lebanon-Palestine areas) can be said to place this region within a category which might be termed "disaster influenced."<sup>100</sup> As the important article by Poirier, Romanowicz, and Taher shows, the Dead Sea and Syrian faults render the region vulnerable to serious seismic activity. Their work demonstrates the frequency of serious earthquake activity, indicating the probability of earthquakes over seven points on the Richter scale every 350 to 400 years and, rather more seriously, events of from five to seven points every *fifty* to one hundred years.<sup>101</sup> My colleague Dr. Walter Manger points out the devastation caused by anything in the range from six to seven plus.<sup>102</sup> The data from the Mamluk period seem to confirm this estimate and, more importantly in this context, to illustrate the damage sustained by structures and lives.

Published and manuscript materials provide considerable information about the nature and frequency of disasters or naturally induced crises for both Egypt and Syria in the Mamluk era. Such phenomena were capable of causing economic loss or disruption and mortality directly and in a combination of ways. Severe weather generated famine which in turn often led to disease epidemics. Also, in the case of famine, birth rates and patterns could be influenced indirectly. In this respect, one must also factor in an element which is impossible to measure and yet necessary in any ultimate assessment of the role of catastrophe in any society: the element of stress.

As I indicated years ago in my *JESHO* study and in my paper on famines, modern disaster studies have shown the stress reactions to various types of

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<sup>98</sup>J. P. Poirier, B. A. Romanowicz, and M. A. Taher, "Large Historical Earthquakes and Seismic Risk in Northwest Syria," *Nature* 285 (May, 1980), 219.

<sup>99</sup>Mustapha A. Taher, "Corpus des textes arabes relatifs aux tremblements de terre de la conquête arabe au xii H./xviii J.C.," Ph.D. diss., Sorbonne, 1979. See especially vol. 2 for Arabic texts.

<sup>100</sup>I owe this designation and the following remarks to my colleague Dr. Walter Manger, Department of Geology, University of Arkansas at Fayetteville.

<sup>101</sup>Poirier, Romanowicz, and Taher, "Seismic Risk in Northwest Syria," 219-220.

<sup>102</sup>Personal communication, Oct. 3, 1997.

catastrophic events.<sup>103</sup> Medical researchers have demonstrated that stress reactions affect human immunity and susceptibility to disease. In the case of serious food crises, this is compounded by reduced efficiency of "cell and humoral defence mechanisms."<sup>104</sup> Adrenalin changes associated with the brain can disturb tissue and immunological defenses leaving the affected organism open to disease onset.<sup>105</sup>

The evidence indicates that stress reactions in the form of intense fear and anxiety were, as one would indeed expect, present in a number of Mamluk Syria's crises. Ibn Qāḍī Shuhbah reports that people in Damascus were terrified by a violent wind and storm in 1381.<sup>106</sup> The Damascenes were said to have been "dejected" by the great famine of 1294-1295.<sup>107</sup> On any number of occasions furthermore, the general fear and distress were evidenced by people imploring God's mercy and holding communal prayers, recitations from the Quran and/or the *Ṣaḥīḥ* of al-Bukhārī.<sup>108</sup> Michael Dols, in an important article on comparative European-Muslim responses to plague, and I, in my *JESHO* essay, have addressed the issue of religious and magical responses to disasters.<sup>109</sup> The focus of the present study excludes a sustained examination of religious-supernatural responses, but their presence indicates the sort of emotional trauma and strain accompanying these frightening events.

Given the nature of this stress, one may hypothesize that public health and patterns of illness were altered from the "norm" by these destructive phenomena. Short of resorting to the macabre skills of paleopathologists, it seems unlikely that proof for this hypothesis will be forthcoming. However, research suggests that such considerations have to be recalled when making any serious statements about public health, disease incidence, or mortality over periods following or intervening between recurring disasters. What, finally, can one say about the role of catastrophic events in Mamluk Syria? Given the frequency of one disastrous episode or another, the direct, indirect, and cumulative results of these events

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<sup>103</sup>George Baker and Dwight W. Chapman, *Man and Society in Disaster* (New York, 1962); Allen H. Barton, *Communities in Disaster* (Garden City, New York, 1969).

<sup>104</sup>Iancu Gontzea and Florin R. Jantea, *Human Nutrition [formerly] The Heinz handbook of Nutrition*, 3rd ed. (Basel, 1974), 20.

<sup>105</sup>Henry and Stephens, *Stress, Health*, 12-13.

<sup>106</sup>Ibn Qāḍī Shuhbah, *Dhayl*, Bibliothèque Nationale, MS arabe 1598; see also al-Maqrīzī, *al-Sulūk* 3:2:442.

<sup>107</sup>Al-Yūnīnī, *Cont. of Mir'at*, British Library, MS Or. Add. 25, 728, fol. 89a; al-Jazarī, *Ḥawādith*, Sauvaget, 47.

<sup>108</sup>See al-'Ulaymī's account, e.g., of Jerusalem's serious drought in 1490; *al-Quds* [Najaf], 2 (1968): 348.

<sup>109</sup>Dols, "The Comparative Communal Responses to the Black Death in Muslim and Christian Societies," *Viator* 5 (1974): 269-287; Tucker, "Disasters and Peasantry," 223-224.

negatively affected Mamluk Syria. Politically, to be sure, with the exception of the plague pandemic and recurring epidemics, many of these incidents seem to have had no direct bearing. The structure of Mamluk political life as such, factionalism, and power struggles among Mamluk amirs all seem to have shaped politics much more significantly than any environmental dysfunction.<sup>110</sup> Disasters probably did erode the economic base and in damaging infrastructure and commerce undercut the material base of the Mamluk system. But in the absence of statistics and hard information from the sources, one may only conjecture this. Furthermore, it should be noted that Mamluk rule persisted for more than 150 years after the greatest of these catastrophes, the 1347-1348 pandemic.

In a similar vein, one may not point to any perceptible revolution in Mamluk Syrian social structure resulting from disastrous phenomena. None of the available information suggests that catastrophes changed the class system or vaulted the peasantry, for example, into the elite. The information we do have does not even indicate a major transformation in the makeup of Mamluk period commercial elites or *'ulamā'*.

Does this mean that disasters had a negligible impact upon the population of Mamluk Syria? By no means. Although we shall never have the sort of data, follow-up interviews, or economic statistics generated from modern U.S. disasters by such agencies as the International Red Cross, Federal Emergency Management Agency (FEMA), or the U.S. Department of Agriculture, we can nevertheless see from the data presented in this study that Syrians incurred loss of property, disrupted lives and, most regrettably, loss of life as a result of many of these phenomena. Clear evidence of this can be seen in the already noted demographic decline of the region by the mid-fourteenth century. Syrian society and government, to be sure, did not collapse. Life went on for survivors and for those suffering economic loss, but there is no doubt that these lives and Syrian society generally would have been healthier and more prosperous had such events not occurred.

In this respect, one must note again that disaster study treats society holistically. The phenomena themselves, after all, do not observe social distinctions or class differences. The well-to-do may be insulated for a time against famine, but earthquakes, plague, and most meteorological disasters do not discriminate socially. If we are to understand the role of these events, we must look carefully at each type and its recorded consequences. Speculation and analogy can be fruitful in assessing probable physiological or micro-organic repercussions, but behavioral responses, including political actions or psychological reactions, are too variable

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<sup>110</sup>One may readily see the nature of Mamluk-era political activity in Lapidus, *Muslim Cities*, 165-191; and P. M. Holt, *The Age of the Crusades: The Near East from the Eleventh Century to 1517* (London, 1986), 107-129, 178-202.

to allow us to stray far from the explicit information of the sources. On both of the latter counts, unfortunately, these sources in fact do not offer us much, certainly not as much as given for Egypt in the comparable period. The sorts of psycho-religious reactions I noted in my study of the Egyptian peasantry of the Mamluk period were not nearly as evident in the research conducted for this essay. Such information as can be gathered offers some insight into trauma or stress reactions, as noted previously, but does not allow one to draw any meaningful conclusions about significant religious change associated with disasters.

With respect, indeed, to any comparison with Mamluk Egypt, Syria seems to have been a much more fortunate region. A rough tabulation, for instance, would yield the following comparative figures: about fifty-five epidemics in Egypt compared to thirty in Syria; twenty-eight earthquakes in Egypt versus fifteen in Syria; and forty-seven famines in Egypt as opposed to twenty-five in Syria.<sup>111</sup> The differences may reflect the quantitative and, perhaps, qualitative differences between the historiography of the two areas during the relevant period. More likely, Egypt really did endure more disasters than Syria. Syria, after all, was not dependent upon the Nile and its uncertainty with the attendant effects upon food supplies. Also while Syria, as indicated above, could be confronted with serious earthquake activity, the fact is that Egypt had its own problems with a Red Sea fault line that could be, if not frequently, certainly upon occasion, a source of damaging shocks.<sup>112</sup> Compared to "disaster-prone" Egypt, "disaster-influenced" Mamluk Syria was a more fortunate place with regard to natural and environmental disasters, if not with respect to foreign invasion or domestic socio-political crises.

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<sup>111</sup>Concerning the epidemics, especially those of plague, see Dols, *Black Death*, 305-334; idem, "Second Plague Pandemic," 168-169, esp. notes 11-12; Shoshan, "Epidemics," 395-403. Concerning earthquakes, see text above and Ambraseys et al., *Seismicity of Egypt*, 41-55; Taher, "Corpus des textes arabes," 2:166-210. For famines see Tucker, "Famines," 18-25.

<sup>112</sup>Ambraseys et al., *Seismicity of Egypt*, xi and passim.