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SPECIAL SECTION: HISTORICAL CLIMATOLOGY IN THE MAYA AREA

INTRODUCTION

In this issue's Special Section we present the first of a two-part series on studies of ancient climate change in the Maya area. Since the time of Ellsworth Huntington (1917, 1924) and Karl Sapper (1931), Mesoamericanists and Mayanists in particular have been aware of the possibility that climate change played a role in the fortunes of ancient Maya civilization.

A brief perusal of the burgeoning literature of historical climatology impresses one with the enormous range and breadth of this dynamic field. One finds a staggering array of studies dealing with climatic trends and anomalies for regions all over the world and covering all periods of geologic, archaeological, and historical time. It would not do justice to the field to attempt to formulate a list of representative topics, but among the many hundreds, a few seem salient: the Little Ice Age, El Niño, glacial expansion and contraction, natural disasters (including especially volcanic events and floods), grain and grape production, and even witch hunts.

The historical study of climate can be approached through the natural sciences or through phenology or through the science that deals with periodic biological phenomena with relation to climate, especially seasonal changes. A fascinating topic, phenology occupies a privileged place in the literature of historical climatology. In this respect, two books have been especially crucial. The publication of Reid Bryson and Thomas Murray's small but influential book *Climates of Hunger* (1977) marks a milestone in modern archaeological awareness of phenology, defined by these authors as "the study of how living things respond to the changing seasons" (Bryson and Murray 1977:60). Historians such as Emmanuel Le Roy Ladurie (1971) also have made excellent use of phenological methods. "Phenology is the study of the dates at which certain phenomena occur in plants about which we possess records" (Le Roy Ladurie 1971:3). Phenology relies on written accounts of changes in certain well-documented plants or crops such as grape vines or cherry trees as proxy records of climate change. What a pity that ancient Maya scribes did not record information on droughts, maize prices, or cacao harvests as their Spanish and indigenous colonial counterparts did! At first blush, phenology would seem to have little application to the study of a pre-Columbian society whose written records concentrate primarily on military exploits and political history. Such a pessimistic conclusion would dismiss the potential future contributions of global teleconnections (Glantz 1996:90). Gill (2000:282–287) has summarized some of the possible global correlations with paleoclimate in the Maya area (but see Demarest 2001).

We can certainly take advantage of historical records produced after the Conquest relating to phenological processes in the Maya area. For the time being, however, most current research on ancient Maya historical climatology is based on empirical observations from the biological and geological sciences and analogies with patterns from the instrumental period. **Joel D. Gunn, Ray T. Matheny, and William J. Folan** provide a historical perspective and a methodological context for this first installment of papers. **Barbara W. Leyden** summarizes the pollen evidence for climatic variability in the Maya lowlands. Covering the entire span of time from the Late Pleistocene to the present, Leyden provides a palynological reconstruction for climate in the Maya area for roughly 40,000 years. Among her most interesting findings are indicators in pollen cores of cultural disturbance of forests in the northern and southern Maya lowlands and the presence of *zea* (maize) pollen after about 2000–1600 B.C. **Marion Popenoe de Hatch, Erick Ponciano, Tomás Barrientos, Mark Brenner, and Mark Ortloff** provide a reconstruction of the paleoclimate in the Valley of Guatemala. Their study is based on analysis of microfossils and pollen from sediment cores taken from Lake Amatitlan and the extinct Lake Miraflores once associated with Kaminaljuyu. They find evidence for a sophisticated system of canal irrigation fed by Lake Miraflores in existence from at least 700 B.C. When Lake Miraflores dried up around A.D. 100–200, the canal system was abandoned. Was the disappearance of Lake Miraflores caused by a prolonged drought? Popenoe de Hatch et al. cannot yet answer this question on the basis of their local data, and they express their hope to address the issue with future research. Perhaps it should be noted that many specialists accept the idea that a prolonged drought affected the entire Maya area, including the highlands surrounding Kaminaljuyu, at the end of the Preclassic (Gill 2000:287, 315), and Popenoe de Hatch (1997:94, 98–100) has inferred radical changes in the material culture inventory of Kaminaljuyu associated with a possible reduction in population for the Early Classic relative to the Late Preclassic period. **Alfred H. Siemens, José Angel Soler Graham, Richard Hebda, and Maija Heimo** report on the *chinampa*-like features of the Candelaria Basin in southwestern Campeche. This region was the storied Acalan province of late pre-Hispanic times, so magnificently described by Scholes and Roys (1968:48–73), dominated by the center of Itzamkanac, now equated with the archaeological site of El Tigre. For the past 20 years Siemens and his colleagues have documented evidence of pre-Columbian intensive wetland agricultural features in the Candelaria Basin. This article suggests that such features were constructed as acts of desperation in response to climatic change.

Richardson B. Gill and Jerome P. Keating offer an intriguing view of volcanism and Mesoamerican archaeology. They propose that large-scale volcanic eruptions contaminate the stratosphere with volcanic products, especially sulfur aerosols, which absorb or reflect incoming solar radiation causing weather change on a global scale and disastrous droughts in Mesoamerica. They point out that Mesoamerica lies in a particularly vulnerable location at the southwestern corner of the Atlantic weather area and the North Atlantic High; thus, the area can be affected by virtually any large volcanic eruption in the world. **Mark Brenner, Michael F. Rosenmeier, David A. Hodell, and Jason H. Curtis** discuss the paleolimnology of the Maya lowlands, examining complex interactions among climate, environment, and ancient Maya culture. Finally, **Lewis C. Messenger, Jr.** explores the study of El Niño events and the implications for ancient Maya civilization. Early Spanish colonists in Peru were the first to write about El Niño (Fagan 1999:xiii). Interest in El Niño increased, in Peru at least, in the mid-nineteenth century as part of a concern for declining guano production (Glantz 1996:23). Messenger finds that the Peruvian ice-core data cannot be used as a proxy for developing a chronology of climate change for the Maya area. Moreover, he concludes that the assertion that El Niño events can be discerned from Andean ice-core data is itself open to question and will require continued work before we can suggest congruency between the data for the Andes and the southern Mesoamerica area. This is a rallying cry rather than an admission of defeat, however, and research proceeds apace.

The reception of these papers will depend on one's own biases or intellectual proclivities. Some will see intriguing new ideas; others will decry them as neocatastrophism. Few will find it easy to remain neutral.

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