Medieval Warmth:
Did the Medieval Warm Period Sink the Maya but Make the Mongols?

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World temperatures are now back up to the range last seen in the Medieval Warm Period (MWP), a time known to have caused droughts in many areas, warmer moister weather in others. The droughts may have destroyed lowland Maya civilization, as well as Pueblo III culture, and may also have impacted Khmer civilization in Cambodia, and other tropical cultures. Recently, Mongolia has been shown to have had warmer weather, which would have made life easier for forest and grassland Mongols, though harder in the drought-stricken Gobi. Perhaps Genghis Khan could ride out with his hordes because of better horse-rearing conditions. On the other hand, not all of Mayaland fell, and not all Mongols rose. Social and human-ecological factors must have made some differences. The central Maya Lowlands were very fine-tuned, relying on delicate balance. Genghis Khan’s eastern Mongol world was especially favored by both climatic improvement and proximity to north China (then controlled by nomadic states). These and other factors evidently mattered along with climate.

Global warming is progressing apace, with 2014 probably the warmest year in recorded history. The disruptions and cataclysms of the future are hard to foresee. Currently, it is not entirely clear how much warming is due to human agency (release of greenhouse gases); natural warming has been going on since the 1800s, with the Little Ice Age over. It is also unclear how much warming will occur.

Some perspective is thus useful, and the Medieval Warm Period is there to provide it. Scientists now agree that the period from 900 to 1300 was relatively warm all over the world, or nearly so. There were particularly warm periods in the 900s and 1200s. These caused infamously grave droughts in what is now the southwestern United States and southern Mexico, among other places. In contrast, they pushed the monsoon farther north in China, and thus brought warmer, wetter weather to currently very cold and dry areas in the north and northwest of that realm. Rather few anthropologists have dealt with this on a wide scale, and the most visible attempt, by Brian Fagan (2008; see also Fagan 2000 on the Little Ice Age, and Büntgen et al 2011 on climate change in history), is far from accurate, as this paper shows. We await a comprehensive history of the Medieval Warm Period comparable to Geoffrey
Parker’s history of the worst of the Little Ice Age—though Parker does not really link climate change to the catastrophes he relates. In this paper I hope to show how climate change actually affects local systems.

The Maya droughts have been well known since Richardson Gill’s book of that title (2000). In spite of initial resistance by those with other pet theories, drought has caught on. It is a standing joke in the field that the latest hypothetical “reason for the Maya collapse” always looks a lot like the biggest worry in the mass media, and global warming has been much in the news, but this time there is real evidence for the droughts and their role in bringing the great cities down. On the other hand, Arthur Demarest has long pointed out that local wars were clearly involved, and now notes that many cities were war-ravaged before the droughts began (Demarest 2004; see Sharer and Traxler 2005 for other theories and a thorough review of Maya history).

There is also Jared Diamond’s argument in Collapse (2005) that the Maya did it to themselves by having too many people using too many resources. Diamond has received a very rocky reception in anthropology, in particular in the book Questioning Collapse (McAnany and Yoffee 2010). McAnany and Gallareta Negrón’s chapter in this book dismisses the whole idea that the Maya collapsed at all, since Maya civilization kept right on going in the northern and southern Maya areas; only the central lowlands suffered real trauma. One has to admit, however, that those central lowlands were the core and heart of Maya civilization, and that they suffered total and permanent loss of all cities and urban life, 90% depopulation, disappearance of intensive agriculture, and disappearance of evidence of writing and high culture. This is a bit more than a hiccup.

Currently, the consensus seems to be that drought in a finely-balanced system was the worst problem. Tikal provides an important case. Recent work has been summarized there by David Lentz and a large group of collaborators, some of whom I know and one of whom, Gerald Islebe, has been a coworker with me (Lentz et al. 2014). Tikal’s greatness in the Maya Classic Period (200-850) depended on highly sophisticated and fine-tuned farming. Intensive techniques included “irrigation, terrace construction, arboriculture, household gardens, and short fallow swidden…coupled with carefully controlled agroforestry and a complex system of water retention and redistribution....” These supported “relatively large population” but “with a heavy cost of reduced environmental resiliency and a complete reliance on consistent annual rainfall.” Unfortunately, “persistent episodes of unusually low rainfall were present in the mid-9th century A.D.” so “last dated monument A.D. 869” (Lentz et al. 2014:18513).

Pollen in a nearby lake shows about 70% deforestation, but there is full evidence for careful forestry practice, including tree rings showing that many mature trees were always available. Tikal needed some construction timber and a huge amount of firewood, probably about 42 million kg per year, about all they could produce. Lime for construction and for treating maize, fuel for cooking, and fuel for pottery making were major consumers. With 70-80 pots per household, even among ordinary people, huge supplies of firewood went into the pots. Swidden agriculture was generally based on cycles of two years farming, then six or seven years fallow; this is standard today in Maya swiddening on very good soil, and Tikal’s soil is not bad. More permanent cropping could be done in wetlands; a local bajo shows dominance of maize (shown by dominance of C4 carbon in the record). Phosphorus was a problem but enough volcanic ash blew in from Guatemala’s volcanoes to bring a lot in. Springs supplied water, but not enough; the city built its pyramids and terraces such that rain runoff went into reservoirs.

All this meant that Tikal was on a knife edge. The least diminution of rainfall would reduce maize production and deprive the city of necessary water. In the Maya environment, rain must fall at the right time and amount in summer or the crop fails; even a small change is ruinous, as I know from a lot of personal research in a particularly moist, fertile area. So the droughts of the 800s devastated it. Life went on—people could disperse into the hinterlands—but a city could not be maintained.

Similar stories are emerging from elsewhere. In general, it partially confirms Diamond. One interesting sidelight is that the tropical rainforests of Mexico and Guatemala—the forests of the central lowlands—have relatively few endemic species of plants and animals. This stands in very sharp contrast to the seasonally-dry forests of Chiapas, Yucatan, and Oaxaca, which have world-class levels of
It certainly looks as if the tropical forests were basically wiped out, and had to recolonize from the south. Any endemics did not survive.

Moreover, the current situation is revealing. In the area of Quintana Roo where I have done field work, global warming is now bringing drought, and also worse hurricanes. It also brings more of the dreaded “hot rains” (choko ha’). These are rains so extremely warm that they stimulate the growth of fungus epidemics on the maize. I have seen this happen; within a few days of such a rain, the maize is dying.

However, I am cautious. Demarest’s point about warfare and its role in pre-drought collapses still deserves consideration. Also, if the Maya so thoroughly wiped themselves out, why did the northern cities continue to flourish? The short answer is that they had water; the boundary line of collapse is more or less the boundary line of cenotes that provide reliable water. But why didn’t the northern cities collapse because the maize crops failed? My guess is that they had tougher varieties of maize, more root crops, and a planting schedule that was less disrupted when the early rains became unreliable. Today, the north plants later and expects rain later than the central and southern lowlands. Drought would have hit the early rains hard. This is all speculation on my part, however. The work has not been done. In the south, there was continued rain, and there are large rivers.

However, there is more to the story. The fall of the central lowlands led to permanent rerouting of trade. The great trade routes change from those centering on Tikal, Calakmul and other central cities to coastal routes—often canoe-maintained—and montane routes over the Chiapas highlands, including ancestors of the Pan-American Highway. With the central lowlands a black hole, forests regrew and trade did not return. Otherwise, the cities would probably have started up again when the Medieval Warm Period ended.

In short, Maya civilization took a terrific hit, but was not really downed. In fact, the last independent Maya state continuing the old religion and using at least some hieroglyphic writing did not fall until 1697—over 200 years after Columbus. Moreover, there are about as many Maya now as in the Classic Period, with flourishing languages and cultures and a tremendous sense of pride and independence. The Spanish conquest has not really happened in Mayaland. Suffice it to quote an election slogan in my area of Quintana Roo a few years ago: “Maintain the pride of being Maya!”

Across the world, the Mongols live in about the most different environment imaginable. They occupy a vast realm of desert mountains and steppes. Their habitat transitions from Siberian taiga—pine and larch forest—to barren, almost lifeless desert. Temperatures vary from over 100 F in summer to below -50F in winter. Economic activity is largely stockraising on the relatively limited areas that have good grass—largely the valleys of the rivers that drain the mountain ranges, and the canyons, pediments and peneplains of the mountains themselves. The vast deserts are occupied by mobile horse and camel herders but do not support a large population.

The Medieval Warm Period here brought conspicuously warmer, wetter times, as shown by tree rings on the Siberian stone pines that are common on the northern mountains, recently analyzed by Neil Pederson and colleagues (Marcarelli 2014; Netburn 2014; Pederson et al. 2014). They are the Siberian equivalent of our whitebark and limber pines here, and look just like limber pines. They can live for an enormously long time, bringing us a record of the past.

Writers had been speculating for some time that warmer, wetter times would have occurred in that period and helped Genghis Khan (Chinggis Khan in modern Mongolian) ride out with his hordes. Arsenio Martinez (2009) produced a major review of this idea well before Pederson’s work. Such times would have vastly increased the available grazing; most of the region is balanced delicately between desert and productive steppe.

This would not only have allowed a steady increase in animals and people; it would have provided the critically necessary grazing resources for a mounted army. One cannot imagine mounted hordes doing well in the southern gobi and the northwestern Chinese deserts. The times would also have provided reliable water in the rivers and lakes—a necessity for herding and for armies and raiding. Most
important of all, warming greatly reduced the incidence of the dreaded *dzud*, the winter ice-storms or heavy snowstorms that prevented the animals from foraging. Horses and sheep are adapted to incredibly harsh conditions, and can easily paw through ordinary snow to get to grass, but if the grass is coated in thick ice or covered by heavy, wet, icy snow, the animals cannot deal with it, and die. This is the most feared contingency for northerly nomads. Dzuds routinely decimated herds in historic times.

For horseback armies, it is absolutely critical to be able to find copious grazing and water supplies at frequent intervals. Mongol soldiers not only had their mounts to worry about, they had their spares; a Mongol soldier would lead from one to four or five spare animals for use if his primary mount became exhausted or was killed. The old theory, identified with Ellsworth Huntington (1907; Fagan 2008 still credits this long-disproved theory), that drought forced the steppe nomads out on their conquests, is exactly 180 degrees from the truth. Huntington should have known enough to realize that the nomads could not possibly have maintained their cavalry in drought periods.

Genghis Khan was born around 1162, and died in 1227, at the height of the Medieval Warm Period. During his time, the steppes and mountains of Mongolia were rapidly improving as stockrearing areas. This allowed rapid expansion of herds and of human population. We have no direct evidence of this, but it is basically certain, judging from all we know about steppe nomads and their society.

Significantly, Genghis Khan’s first conquests—once he had consolidated control of the Mongol hordes—were westward into central Asia. This took him over very high mountains and through very harsh deserts. Genghis’ military genius included an incredible ability to move enormous armies with extreme rapidity over appallingly bad terrain, even when the armies included ordinary central Asians as well as the tough, desert-hardy Mongols. Neither Genghis nor any other genius could have done this under current conditions of cold drought in the gobi and in much of Xinjiang.

As everyone knows, Genghis and his heirs conquered most of the world he knew about. The only consequential areas they never conquered were India, whose climate and diseases were not friendly to steppe nomads, and the southwestern Middle East and North Africa, defended by the implacable Mamluks. The Mongols never conquered Europe, but this appears to be largely because it was so poor it was not worth the bother. They took what they wanted of the Byzantine Empire.

But the Mongols were a spent force by 1400, done in not only by endless succession wars but also by the beginning of the Little Ice Age. No longer could they ride out from a huge, lush refuge in Mongolia. Genghis had set up his capital at Karakoram in the center of modern Mongolia, where a river is squeezed between ridges and the water is forced to the surface, creating a lush internal delta. It must have been paradise in his time, but now it is a dry place with neither enough resources for a capital nor good routes leading outward from it.

In China, the Chinese rose in rebellion against the Mongols and threw them out in 1368. This was apparently not a particularly racist or nationalist event, simply a typical dynastic transition. It was, however, distinctive in that it was the only genuinely popular revolution that ever toppled a Chinese dynasty. It left the new emperor, a former drifter and minor crook, saddled with a huge nation facing a much colder and drier time. Also, contrary to the old myth that China always absorbed her conquerors, the Mongols simply rode back to Mongolia, from which they continued to harass and attack the Chinese borders. They actually sacked Beijing as late as 1550. Of course they continue to be a major ethnic group today; about half their land and people are within China (Inner Mongolia), half in independent Mongolia.

As in the Maya case, however, we cannot possibly give climate all the credit. The Great Man theory of history is not much of a theory, and historians snort at it, but it is certainly difficult to imagine the Mongol conquests without Genghis Khan (Ratchnevsky 1991). He not only was a brilliant and utterly ruthless leader; he had good judgment of men. He picked excellent generals and gave them exactly the freedom they could handle. He was a superb manager, always able to deal with detail without getting lost in it, always able to see the big picture, and always able to outfox and outplot the competition. Moreover, Mongol solidarity was all-important. The Mongols are a classic example of a segmentary lineage society. Marshall Sahlins’ description of the segmentary lineage as “an instrument of
predatory expansion” (Sahlins 1961) fits the Mongols perfectly. Genghis Khan was a master of additive linking of lineages and of appealing to unity of descent all the way up to the gray wolf and fallow deer who were the mythical parents of the Mongol people.

In short, the Medieval Warm Period—brought down lowland Maya civilization, but only because of ecological fine-tuning and, probably, constant intercity war (I think Demarest is right). The same event brought the Mongols riding out of high central Asia, but only because they had one brilliant leader and a lot of very competent ones who would serve him.

Other parts of the world had their own trajectories. Everywhere, human agency mattered. People dealt in all manner of ways with changing climates.

The Moral
Climate, human agency, and culture—local knowledge, local society, trade, contact, war—are all intertwined. Changes, whether rise or fall, cannot be understood without taking into account the dynamics of the wider environment, the actions and interactions of individuals, and the emergent phenomena of society. These are all necessary to any social explanation, just as sodium, carbon and oxygen are all necessary to sodium carbonate. If you don’t have one, you don’t have the product. You cannot find a basic driver in these situations; it is the interaction of environment, individuals, and society that makes the event.

This is clearly an important observation during this period of warming that is even faster and soon to be even more extreme than the Medieval Warm Period. How we deal with the challenge has everything to do with local culture and with individuals and their ability to work with the situation.

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