

Prehistoric flood from ice surge

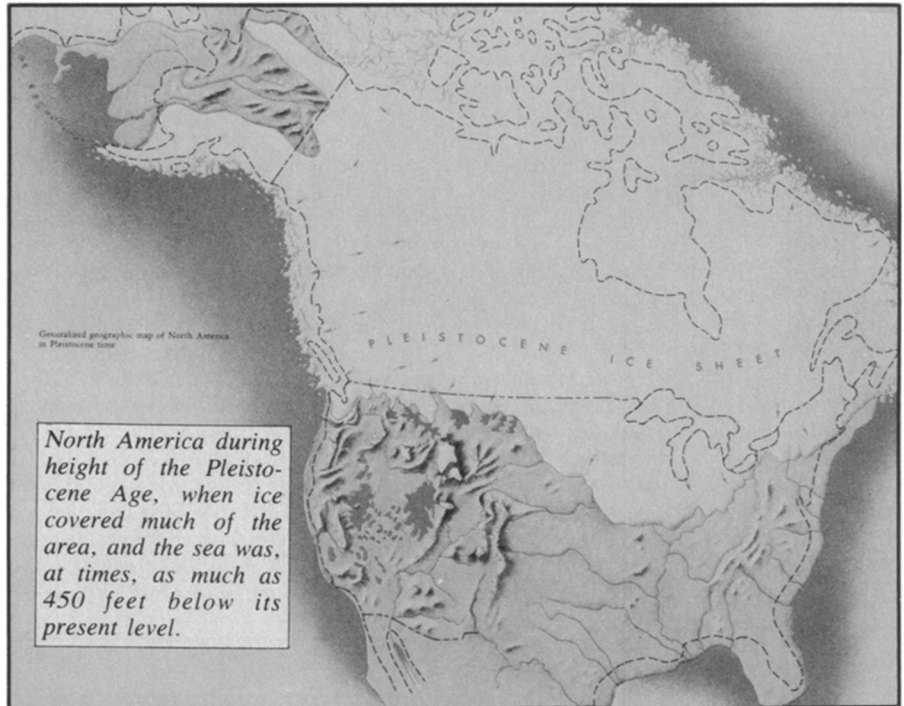
In almost every culture, from the dim, prehistoric recesses of the early Neolithic period, emerge strikingly similar tales of a great flood that swept away emerging civilizations and changed the face of the earth. New evidence gathered from sea-floor cores not only confirms the existence of such a universal deluge and offers a tentative explanation, but raises the possibility that similar flooding could happen again.

Paleoclimatologist Cesare Emiliani and an interdisciplinary team of seven co-workers from the University of Miami conclude from analysis of core samples taken from the Gulf of Mexico near the mouth of the Mississippi River that during the 10th millennium B.C. the Laurentide ice sheet covering much of the Northern Hemisphere underwent a sudden surge, readvancing southward, where it quickly melted. The released water would have caused extensive inland flooding and raised the sea level perhaps some tenths of meters per year. Their report is in the Sept. 26 *SCIENCE*.

The time estimate for the peak of this flooding, 9600 B.C., coincides almost exactly with Plato's date for the inundation of Atlantis. Other cultures also have records of a great prehistoric flood, from the account of Noah's Ark to American Indian legends, but the timing of these is less certain. Since the sea level was some 150 feet lower at the start of the flooding than it is today, the isolation and submerging of whole civilizations would be well within the realm of possibility.

The Miami team reached its conclusions by analyzing isotope concentrations in fossil shells laid down in the cored sediments, and by noting changes in the plankton species represented. Measurements of concentrations of oxygen 18, using a mass spectrometer, revealed a sudden decline of the isotope in fossil shells at a core depth of about 150 centimeters, indicating that the surrounding seawater had suddenly become fresher when that sediment was being laid down. By then checking the concentrations of carbon 14, using scintillation counters, an age of about 9600 B.C. was established for the layer. Finally, an abundance of cold-water plankton species indicated that the water temperature was then about three degrees C. colder than at present.

The sudden decrease of salinity coincides with a previously recognized glacial event: the so-called "Valders readvance," in which the retreating arctic ice-cap suddenly spread again into what is now the northern part of the United States. (Tree-ring data had been used to establish the event). Emiliani and his colleagues conclude that the warming trend signaling the end of the last ice age caused



this broad but thin ice sheet to "surge" toward lower latitudes, melting rapidly as it went, and sending floods of fresh water toward the oceans.

"We postulate that ensuing flooding of low-lying coastal areas, many of which were inhabited by man, gave rise to the deluge stories common to many traditions," Emiliani and his colleagues conclude.

Presumably ocean-bottom cores from other coastal areas around the world will

now be checked to see whether similar flooding occurred at about the same time as in the Gulf of Mexico. These investigations are sure to shed more light on what happened during the last ice age and the effect on emerging human civilization. In addition, the whole subject has a startling modern footnote: Some scientists hypothesize that similar catastrophic surges could still occur in the Antarctic ice sheet, causing new global flooding. They are likely to gain new credibility. □

Environmental action in China

Like so many other technical ventures in the Peoples Republic of China, environmentalism is largely a grass-roots affair: an effort to mobilize local, rural resources and involve the nation's masses in great voluntary programs. One of the first detailed descriptions of these efforts was presented as a part of the current visit to the United States by 14 Chinese scientists in the Scientific and Technical Association delegation. Speaking to a small group of scientists at the National Academy of Sciences in Washington, environmental chemist Liu Ching-yi described current research in environmental areas and practical programs aimed at purifying China's air and water.

The rural environment, where 80 percent of China's population still lives, has undergone "profound change," she says. The age-old decline of soil, forests and rivers is now being reversed through irrigation, reforestation and fertilization programs coordinated by government agencies but exercised at the local level. Some 1.3 million hectares of land each year are being newly irrigated, "extensive" reforestation projects are reestablishing lost timber reserves and stemming erosion,

and human excrement is widely collected for fuel and fertilizer production. Small "marsh gas" fermenters that transform such wastes into gas for heating and light can be afforded by individual families, though some communes choose to pool their wastes and use the produced fuel for running irrigation pumps, and so forth.

In the cities, the aim is to find ways of having "comprehensive utilization" of wastes, Liu says. At trash purchasing stations, people are paid to recycle waste materials. Industrial pollution is controlled mainly through site planning. Factories are moved away from city centers, spaced far enough apart that pollutants are not concentrated to dangerous levels, and located with careful regard to atmospheric conditions, in order to obtain maximum dispersion of wastes. In Peking, for example, prevailing winds are from the northwest, so industries were moved to the southeast part of the city.

Environmental health programs have centered on eliminating the "four evils:" flies, mosquitoes, rats and bed bugs. Smallpox, bubonic plague and some other diseases have thus been successfully wiped out in China, and progress is being