buried in marine sediments before it can be recycled by organisms. Intermittent stagnation of one or more of the ocean basins by whatever means would, of course, produce an immediate deficit in the available budget of marine nutrients. Such stagnation might conceivably have occurred as a result of rapid diastrophic or climatic episodes [see, for example, A. G. Fischer, in *Problems in Palaeoclimatology*, A. E. M. Nairn, Ed., Interscience (Wiley), New York, 1965], but the climatic oscillations of the Pleistocene did not bring about noteworthy mass extinctions of major terrestrial or marine communities (mass extinctions of large herbivorous mammals occurred mainly after the last major retreat of the Pleistocene glaciers). Perhaps the environmental changes of the Pleistocene were too slow, not sufficiently protracted, and of too limited range.

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Severe-Weather Forecasting

John Walsh's article "Tornadoes: Weather Bureau office in Kansas City is nerve center for severe weather warning network" (News and Comment, 4 June, p. 1306) presents an excellent, concise summary of the U.S. Weather Bureau's activities in forecasting severe local storms. The article is concerned with the contributions of a specific agency in this area and does not purport to include a survey of the work of other units. However, mention is made in general terms of improvement in knowledge of thunderstorms during World War II and the demand for better severe-storm forecasting, which is attributed to the rise in commercial air traffic.

Therefore I believe that a few comments concerning the implementation of techniques and units for severe-weather forecasts are appropriate. Before World War II meteorologists generally agreed that forecasts of time and place of tornado occurrences were beyond the state of the art. During 1948, Ernest J. Fawbush and Robert C. Miller of the Air Weather Service detachment at Tinker Air Force Base, Oklahoma, developed available techniques into a reliable system for forecasting severe local storms. In 1949 the Air Weather Service invited U.S. Weather Bureau regional directors at Oklahoma City, Kansas City, and Fort Worth to visit Tinker AFB. As a result of their meeting with Fawbush and Miller, arrangements were made for the direct transmission of the Air Weather Service's severe-weather forecasts affecting Arkansas, Kansas, Missouri, Oklahoma, and northern Texas to the U.S. Weather Bureau offices at Oklahoma City and Kansas City. These forecasts were monitored by the U.S. Weather Bureau for use in warning the civilian population when the situation warranted such action.

In 1950 the Gulf Coast states were added to the area of responsibility, and in 1951 the Air Force Severe Weather Warning Center (SWWC) was established with responsibility to provide forecast coverage for the entire continental United States between the Appalachians and the Rockies. The awareness by certain civilians and the newspapers of the existence of these forecasts prompted a demand for similar forecast services to the general public. Accordingly, in March 1952 the U.S. Weather Bureau established a specialized forecast unit, known as the Severe Local Storms Unit, in Washington, D.C. This unit moved to Kansas City in 1954. The U.S. Weather Bureau Severe Local Storms Unit and the Air Force Severe Weather Warning Center were collocated in 1956 at Kansas City.

As a result of their pioneering investigations and development of techniques for forecasting tornadoes and other destructive local storms, Fawbush and Miller were presented the Meisinger Award of the American Meteorological Society in 1956.

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"Wasted" Water

I am impressed with the sober thoughts of D. B. Luten (Letters, 9 July, p. 133) on some of the burgeoning plans to conserve our natural resources. At all levels of government and among the public in the United States there appears to be a hard-core belief in BIG projects to provide water in greater quantities to specific places for specific purposes. The NAWAPA proposal referred to by Luten is one such project, but there are others of equal importance because of their implications. It seems that everyone is