

CLIMATE CHANGES CALLED OMINOUS

Scientists Warn Predictions Must Be Made Precise to Avoid Catastrophe

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Special to The New York Times

WASHINGTON, Jan. 18 — Changes in the earth's climate are inevitable and mankind must learn to predict these variations to avoid potential catastrophe, a group of prominent scientists has concluded after a two-year study.

"A far greater understanding of these changes is required than we now possess," the group's report said. "It is, moreover, important that this knowledge be acquired as soon as possible."

The report said global use of land for agriculture, water for irrigation and drinking and air and watersheds for waste disposal was approaching the limit.

"A change of climate, even if sustained only for a few years' time, could seriously disrupt this use pattern and have far-reaching consequences," the report said.

Changes Already Noted

The scientists cited recent trends as well as evidence from history and the span of geologic time to suggest that changes in the climate are already taking place and that conceivably, major changes could occur soon.

The study is to be made public within the next few days by the National Academy of Sciences. It buttresses similar conclusions in several other reports published within roughly the past year.

The most drastic potential change considered in the new report is an abrupt end to the present interglacial period of relative warmth that has governed the planet's climate for the past 10,000 years. Recent studies have produced strong evidence that such warm periods tend to last 8,000 to 12,000 years and that they sometimes end abruptly.

The report also noted that periods of benign climate comparable to the present one are unusual and have existed for about only 8 per cent of the last 700,000 years.

"There seem little doubt that the present period of unusual warmth will eventually give way to a time of colder climate, but there is no consensus with regard to either the magnitude or rapidity of the transition," the panel said.

"The onset of this climatic decline could be several thousand years in the future," it said, "although there is a finite probability that a serious worldwide cooling could befall the earth within the next hundred years."

Food Production Link

Even in the absence of such drastic change, human welfare could be profoundly affected by minor variations, the panel said, because food production is so closely geared to present climate conditions. The scientists noted that the average surface temperature in the Northern Hemisphere increased steadily from the eighteen-eighties until the nineteen-forties, but has dropped steadily since. It is now halfway back to the level of the late 19th century.

Between 1958 and 1963, the hemisphere's mean temperature dropped about two thirds of one degree centigrade.

Scientists note that there have been major periodic ups and downs in world climate within the present interglacial epoch. The best known of these is a long cold spell, often called The Little Ice Age, that is well-documented in European history. It spanned roughly from 1430 to 1850.

No one knows whether the present trend in temperature presages a similar cold period, but specialists tend to be more concerned about this kind of possibility than about the presumably far lesser risk of an abruptly starting new ice age.

The new report also expressed concern over the increasing importance of man's effects on climate. It is still unclear whether the increased levels of carbon dioxide in the atmosphere, caused by burning fuel and by polluting the atmosphere with dust, other particles and gases, will raise or lower global temperature.

Effect of Waste Heat

Nevertheless, some scientists believe that such effects of man's presence will be substantial enough to affect global climate by the middle of the next century. It has also been suggested that, roughly by that time, industrial society's production of energy will generate so much heat as to have a major climate impact itself.

Indeed, the new report said that man's production of waste heat might, in the next century, become the limiting factor in deciding how much energy mankind can use.

"Our vulnerability to climatic change is seen to be all the more serious when we recognize that our present climate is in fact highly abnormal, and that we may already be producing climatic changes as a result of our own activities," said the panel.

"We simply cannot afford to arrive unprepared at the doorstep of either a natural or man-

made climatic catastrophe," the report declared.

A major emphasis of the report, and its prime purpose, was to recommend in detail a large-scale research program designed to give scientists the ability to understand and, to some extent, to predict, changing trends in climate.

The panel recommended a research program starting from a present funding level of about \$18-million a year and expanding gradually to about \$67-million a year by 1980.

Technology's Role Cited

The panel noted that understanding global climate has been possible only since the recent development of sophisticated computers and the use of earth satellites to monitor weather, atmosphere and oceanic conditions.

The National Academy of Sciences report and roughly a half-dozen others produced within the past year or so have been analyzed recently by a special subcommittee of the President's Domestic Council. Its chairman is Dr. Robert M. White, administrator of the National Oceanic and Atmospheric Administration.

Late this week, Dr. White said the subcommittee had recommended a major scientific effort covering many of the same objectives as that of the report done under the auspices of the National Academy of Sciences. In some respects, he said, the subcommittee's recommendations go beyond those from the academy.

Norman Ross, an assistant director of the Domestic Council, said recommendations for climate research have recently been forwarded to the White House. They cover options involving the possible spending of \$10-million to \$40-million for the next several years on research to understand climate better.

The report being published by the National Academy of Sciences was produced by a panel under the chairmanship of Dr. W. Lawrence Gates of the Rand Corporation and Dr. Yale Mintz of the University of California.

The study was supported by National Oceanic and Atmospheric Administration and National Science Foundation. The panel is a part of the United States Committee for the Global Atmospheric Research Program, an international long-range research undertaking. The committee functions under the auspices of the National Academy of Sciences-National Research Council.