

Climates of Hunger

Reid A. Bryson
and
Thomas J. Murray



Mankind and the world's
changing weather

Alternate Selection of the Book-of-the-Month Club

CLIMATES OF HUNGER

MANKIND

AND

THE WORLD'S CHANGING WEATHER

Reid A. Bryson

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Thomas J. Murray

THE UNIVERSITY OF WISCONSIN PRESS

Published 1977
The University of Wisconsin Press
Box 1379, Madison, Wisconsin 53701

The University of Wisconsin Press, Ltd.
1 Gower Street, London WC1E 6HA, England

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Printings June 1977, December 1977, January 1979

Printed in the United States of America

ISBN 0-299-07370-X cloth, 0-299-07374-2 paper
LC 76-53649

Foreword

I am quickly turned off by books written by specialists for other specialists—which this book is not. It is a book I shall cherish—and persuade my students to read. Climate has been one of the many historic influences that historians have failed to take seriously. Or in some cases they have taken it too seriously, while lacking the factual basis to back up their theories. Most climatologists don't read history, so that they, too, haven't been able to make the connection.

Bryson and Murray belong to a small but growing group of generalists who have technical training *and* a grasp of the facts of human history. They are able to make the connection. The fall of Mycenae is plausibly related to sudden drought. So is the southward migration of the Hittites. So is the sad end of Harappa, aided in this case by their own foolish use of the land. And so are many other historic changes where we have hitherto leaned on institutional failings, hubris, or sheer chance to explain events. Many will quarrel with the connections offered. But none will have any trouble understanding. The authors have written for the citizen, not a narcissistic coterie.

They are not alone. In the last few years a small but precious breed of climatic historians has transformed our knowledge of the past thousand years: Páll Bergthorsson, patiently reconstructing the record of sea ice around the shores of Iceland, the real bell-wether of northern hemisphere climate; Gordon Manley, calibrating the old thermometers of England to give us a temperature record back to the seventeenth century; Hubert Lamb, showing that one can draw tentative weather maps long before the days of weather stations; and Le Roy Ladurie, combing the guard-books of monasteries and vineyards, using the grape and its productivity as a surrogate for instruments. These, and many more, have begun to show what climate *was*—and may be again.

Nothing could be more timely, for climate is once again at the heart of the matter. The 1970s have produced some spectacular droughts, floods, gales, and freeze-ups—many more than in recent

decades. These things have hit us in our pocketbooks. They have caused crop failures, and hence price inflation. They have reduced some of Africa's new republics to the point of despair and bankruptcy. And they have raised again the specter of the 1930s, that our own wheat fields may again blow away, just when the world needs them most.

I hope that this little book will make a dent in the armor of complacency that protects our politicians against this new intransigence on nature's path. God knows we need awareness—and the number of times my phone rings shows that the awareness exists among the media and the public. But we also need information, and a perspective. We need to be able to say: these things that we predict have happened before, and can therefore happen again. We need critical, self-aware prophets. Bryson and Murray are clearly among them.

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December 15, 1976

Prologue

In 1973 an international group of scientists wrote to the President of the United States about a matter of grave concern. They were specialists in the history of ice ages, and they could see from the rhythm of past ice ages the possibility of another ice age within centuries, and almost positively within a few millennia. There is no imminent danger of a new continental ice sheet like the one that existed more than 10,000 years ago from the Arctic to the Great Lakes and the Atlantic to the Pacific. These take millennia to grow—although we should not ignore changes on that time scale, because we are building dams and nuclear waste facilities with planned lifetimes of centuries and longer.

But climatic changes preceding the formation of such ice sheets are also extremely important, as are the fluctuations that occur throughout unglaciated times.

For three decades the nations of the world, aided by superb agricultural science and technology, have kept food production abreast of a rapidly growing population. In the late 1960s it appeared that the “Green Revolution” was gaining in the constant race against famine. But since 1972 we have seen the international economy—as well as world news—strongly influenced by climatic events.

The Soviet Union purchased 18,000,000 tons of grain from the United States in 1972 and another 12,000,000 tons in 1975, with repercussions on domestic food prices and on our balance of payments. The Russian purchases were directly related to drought. In 1974 United States corn production was significantly reduced as a result of drought, frost, and in some cases overly wet weather.

During these years we have seen drought in the Sahel and in Central America, severe frost damage to Brazilian coffee, poor monsoons in South Asia, and many other climatic vicissitudes. Moreover, the winter of 1977, with record cold in the midwestern and eastern United States, snow in southern Florida, and a continuing

drought in the Great Plains and the West, emphasized again the effects of climate on human activity.

And yet, in a world where grain yields have diminished since 1972, reserves of grain are very small, and the costs of producing and buying food have sharply risen—partly as a result of increased petroleum prices—human population continues to grow. If the world is to feed seven billion people by the end of the century it cannot afford more production years like those since 1972. Every year in which the climate intervenes in food production is serious. Climatic fluctuations become far more important than when there are large surpluses and rising production.

Why “climatic fluctuations” rather than “years with adverse climate”? Many of our food crops are very well adapted to the climate under which they are grown—for example, corn. This means that the best yield is obtained under climatic conditions like those of the recent past (often called “normal” climate). Any departure from “normal” brings a lower yield; any fluctuation is adverse for such well-adapted crops.

We have not yet resolved the question of how soon the next ice age will begin, or even whether we are already in the transition period. However, we are not left without clues about what is possible.

This book sketches some climatic changes of the past and their effects on civilizations. Climatic history shows us that:

1. We should not think of the climate and weather of our lifetimes as an unchanging “normal.” The mid-twentieth century is not typical of the previous thousand years—and it is even less typical of the past one million years. We have ignored what climatic change can do to our agriculture, and our populations. We have depleted the petroleum resources we might need for massive readjustments when climate reverts to a more typical pattern.
2. Climate not only varies year by year but can change rapidly to a new multi-year average.
3. The climate, once changed, can stay changed for long periods of time. Within the last thousand years there has been a 200-year drought in the United States corn and spring wheat belt.

4. Records of past climates also show that those times in earth history when temperatures in high latitudes have been lower, have generally been times of greater weather extremes and erratic or absent monsoon rains in Asia. These would affect United States domestic and foreign policy as well as the people in those lands.

From about 1945 to the present, *temperatures at high latitudes have fallen irregularly.*

5. Once an ice age ends, the climate usually stays interglacial for ten to twelve thousand years. The present interglacial is about 10,800 years old.

We cannot predict with certainty the shape of the climatic future. But then decision-makers rarely have the advantage of precise foresight. Any policy is an effort to make the most of the future, with all its unknowns.

Just as an insurance policy is a recognition of risks and contingencies, so our national policy must recognize certain climatic risks and contingent problems.

Even climatic fluctuations that appear to be small in size can be significant economically. Our research at the University of Wisconsin-Madison shows that an increase of 1°C (1.8°F) in the summer temperatures in the northern plains can reduce the gross dollar income of the spring wheat farmers by \$131 million, and a modest 20 percent shortfall of precipitation can cost another \$137 million. Climatic variation, like death and taxes, is certain. We know of no century with constant climate. But a more important question is whether the climate will be approximately like that to which our activities have been adapted or whether we will be dealing with a major climatic shift.

The probability of the next decade being less favorable than the 1956-73 period in the American corn belt is very high—around 98 chances in 100, if past history is a guide.

Considering only the time since 1880, three out of four decades were colder than the 1931-60 average (for the Northern Hemisphere).

Since A.D. 1600, 95 percent of the decades in the far northern Atlantic have been colder than the 1931-60 average.

These facts and probabilities indicate the likelihood of a more unstable climate than that of the decades just prior to 1970, and of a higher number of poor monsoons in Asia, and poor agricultural years in North America, Europe, and the USSR. While scientists do not agree on all the above points, most of those who have analyzed the data agree that the next decade will not be optimal for agriculture.

As long as world food grain reserves are low, as they are, and population is rising, as it is, there is danger for the nation in the political instabilities that climatically induced crop failures can and do produce. The American people also have a tradition of concern for those people who are suffering hardships. For these reasons, climatic variation must be considered as a factor in national policy formulation.

ACKNOWLEDGMENTS

There are a number of people who have made important contributions to the preparation of this book: John Ross started the authors on this project; Elizabeth Steinberg and Jan Blakeslee edited the manuscript and significantly improved it; Vicki Lant drew the maps and charts; Stephen Schneider reviewed the manuscript and suggested changes; Pam Egan Johannsen and Vicki Lant drew the chapter heading sketches; Donald Vincent worked on references and indexing; Barbara Abbott made suggestions on an early draft.

But most of all the book exists because of those who had faith over the years of research.

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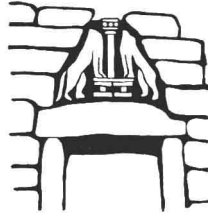
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I TWO TALES OF FAMINE

A Drought in Ancient Greece



CLIMATES OF HUNGER are changed climates, climates that no longer support the crops and herds, berries, fruits, and game they once did. Climates change: a culture closely tied to a particular climate finds itself in danger.

Where agriculture is hard pressed to support a population, that population is in jeopardy—for climate does change, rapidly and significantly enough to alter the productivity of the land. Favorable climates that aid agriculture allow populations to grow beyond what later, less advantageous climates will tolerate.

We know climate can change, because climates have changed. Over millions of years, ice ages have come and gone—seven of them in the last million years alone. Even in the 10,000 years since the last ice age, climates have set boundaries for human activities. Human technology affects these boundaries, but so does changing climate. Cultures have developed and expanded, then withered and sometimes disappeared as new climates modified the potential of the land.

4 I. Two Tales of Famine

In our world today, as in the past, there are climates of hunger. As climate changes there will be both regions of improvement and regions of deterioration. Will lands now highly productive become too arid or too cold? This question is not fully answerable, but neither is it academic. Attempts to find answers, and to prepare for the climatic changes ahead, are vital to millions of people in the world.

In this book we will consider a number of past climatic changes, for the past is the key to the future.

On a sunny plain 60 miles southwest of Athens lie the ruins of the city of Mycenae. Twelve hundred years and more before the birth of Christ, Mycenae was the hub of a great civilization. Its massive main gate, with two stone lions on guard, its main walls, half a mile long and up to 30 feet thick, testify to the power it held. Its excavated tombs have revealed a wealthy and sophisticated warrior civilization with a farflung trade that dominated the Aegean and much of the Mediterranean seas for centuries.

Quite abruptly, before 1200 B.C., Mycenaean power began to decline. In 1230 B.C., the main palaces and granaries of Mycenae itself were attacked and burned. Other Mycenaean centers, including Pylos and Tiryns, also show signs of decay and destruction, but it is not known whether they were victims of their ties to a weakening Mycenae.

The decline and fall of Mycenaean civilization was so sudden and so complete that its memory survived only in the legends of Agamemnon and Achilles, of the fall of Troy and the voyages of Odysseus, given expression some 600 years later in the poems of Homer. And they remained legends until a stubborn amateur archaeologist with a love of Homer, Heinrich Schliemann, began to dig in the 1870s.

Neither then, nor now, has anyone fully explained the downfall of this vital culture.

Invaders?

Perhaps the most widely held current theory is that Dorian Greeks from the north overran Mycenaean Greece. In such a rapid fall of a major civilization, invasion is an obvious possibility. And the