

FRAGILITY
CLIMATE SCIENCE, CLIMATE HISTORY
AND THE RISE AND FALL OF CIVILIZATIONS

by
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Preface

When my erstwhile student and close friend Ronnie Ellenblum, Professor of Historical Geography and Environmental History in the Department of Geography at The Hebrew University of Jerusalem, died suddenly of a massive heart attack on January 7, 2021, at 69, he was working on the final version of this book. Taking into account the comments and criticisms of three readers and adding new insights of his own, he had completed a thorough revision of Part I and was poised to revise Parts II and III and the Conclusions. Rather than leave this important work unpublished, I asked several of his colleagues and collaborators to help bring Ronnie's work to completion, and they responded willingly. In addition, Ronnie's expansion of the original preface into a chapter and the partition of the original Chapter 5 into two chapters required the renumbering of parts and chapters; and the many transpositions of paragraphs necessitated the deletion of some clauses that had linked them to their original sequels. Some repetitions have been deleted and some minor factual mistakes corrected.

In the latest version found on Ronnie's computer, dated January 6, 2021, the original preface had been developed into an Introduction delineating the proposed theoretical framework—the fragility paradigm. Part I (Chapters 1–5), which deals with the history of the study of climate in the humanities and the natural sciences, had been revised and expanded. Ronnie described its contents at the end of his original preface:

In Chapter 1 I shall examine the process that began at the peak of climate determinism and at whose end the humanities abandoned the study of climate history and recoiled from attempts to propose climatic explanations for historical processes. In Chapters 2–4 I shall

deal with the development of the climate sciences from their humble beginnings—the attempt to discover the chemical, volcanic or cosmological forces that might cause global cooling and Ice Ages—and up to the turning of climate history into the history of nature that also attempts to provide explanations for climate changes that occurred before the beginning of measurements. I shall also attempt to point out the anxieties that motivated many of the studies of climate—fears of cold, of anthropogenic pollution, of volcanic eruptions and of uncontrollable global warming.

Chapter 5 discusses present-day attempts at bridging the gap between the humanities and the exact sciences regarding the study of past climates.

Parts II and III, as Ronnie wrote, are “devoted to the complementary characteristics of the sense of fragility.” Part II (Chapters 6–7) “survey[s] processes of collapse and propose[s] a model for social, economic and generally human responses and processes that develop in times of crisis. [It] also attempt[s] to show, on the basis of empirical data from the Mediterranean basin, that a decrease of a mere half a standard deviation in the average quantity of precipitation over the period of only a decade can have critical consequences and threaten the nutritional security of populations.” Roi Ankori-Karlinsky, who coauthored Chapter 7, put the finishing touches to this part. Part of the original Chapter 7, discussing the potential impacts of prolonged drought on traditional Mediterranean agriculture on the basis of data drawn from modern studies of the effects of fluctuations in annual precipitation on water sources in the Land of Israel, has been extracted from the text and is included herein as Appendix 2, also coauthored with Roi Ankori-Karlinsky.

Part III (Chapters 8–10), as Ronnie explained, “deal[s] with affluence, its effect on humanity, and how it is expressed in texts, archaeology, ceremonies, public spaces and mentality. This part ... also include[s] a quantitative component that will help answer the reverse question to that asked in Part II: How many sequential years of stable climate and timely rains are needed in order to create a reality of affluence and for each of its elements to be expressed?” On January 6, 2021, Ronnie added to Chapter 9 a discussion of the Roman *limes*. Tal Ulus, who

coauthored this chapter with Ronnie, and Dr. Anna Gutgarts, whose Ph.D. dissertation Ronnie codirected, revised Chapters 8–10 according to the comments of the three readers, and Alexander Yakobson, Professor of Ancient History at the Hebrew University of Jerusalem, inspected the revised chapters.

In our discussions of the book, I pointed out to Ronnie that formulations like “from the 1920s to the second decade of the twenty-first century, scholars in the humanities and the social sciences refrained from offering climatic explanations for historical phenomena” were far too sweeping. At the time, Ronnie agreed to refer to “most scholars” rather than to “scholars”—yet this modification does not appear in the January 6 file. For a while I played with the idea of adding the word “most” in parentheses, but eventually I decided to leave his statements unchanged.

Toward the end of the Introduction, Ronnie asks, “How long does climate stability need to last to enable a state of affluence?” That question remained unanswered in this book, but Ronnie did address it in an article coauthored with Dr. Leigh Chipman and Prof. Gideon Avni that appeared in 2021, after his death.¹ I asked Dr. Chipman to prepare a summary of it, and her summary is published herein as Appendix 1.

Ronnie started a rudimentary bibliography, which was supplemented and rearranged by Dr. Chipman. I chose to add references to books and articles suggested by the three readers, which Ronnie—alas—never got to deal with.

I would like to thank Dr. Chipman, who translated Ronnie’s many Hebrew additions into English and compiled the Index; Dr. Anna Gutgarts, Roi Ankori-Karlinsky, Tal Ulus and Prof. Alexander Yakobson for their help with Chapters 7–10; Tammy Soffer, who drew or redrew most of the maps; and Prof. Lee Mordechai, who supplied the data for Noah Webster’s book, to which Ronnie alludes in one of his footnotes. I am deeply indebted to Deborah Greniman, Senior Editor at The Israel

1 Leigh Chipman, Gideon Avni and Ronnie Ellenblum, “Collapse, Affluence and Collapse Again: Contrasting Climatic Effects in Egypt during the Prolonged Reign of al-Mustansir (1036–1094),” *Mediterranean Historical Review* 36/2 (2021), pp. 199–215.

Academy of Sciences and Humanities, for her devoted care in preparing this book for publication: she coordinated between Ronnie's collaborators, edited the text together with Dr. Chipman, improved the style, oversaw the assemblage of maps and illustrations, and much more.

The book as it stands now, and especially the last six chapters, which Ronnie was not granted the time to revise, surely differs from the book he would ultimately have published. Yet, even in its present form, the book amounts to a highly original contribution to our understanding of the impact of climate change on past human societies and to the history of climatological thought.

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