Climatic Evolution

World Climate from 8000 to 0 B.C. Proceedings of an international symposium, London, April 1966. J. S. SAWYER, Ed. Royal Meteorological Society, London, 1967. iv + 229 pp., illus. Paper, $8.80.

Because "meteorologists are just about within sight of achieving a quantitative theory of the general circulation of the atmosphere," P. A. Sheppard writes in the preface to these conference papers, and their models of the earth-atmosphere system will soon be "sufficiently realistic to be compared with observation where it exists," the need may be foreseen for "[integrated, quantitative] data on the actual climates of the past and on their evolution against which to test the predictions of theory." The purpose of the conference was to explore the possibilities of such integration of data for one fairly well-documented period of substantial change, resembling the present in landform. The period chosen was 8000 to 0 B.C. The program was planned "with the aim of achieving, as far as possible, a world picture for the period, a quantitative assessment of the data (in time and meteorological quantity), and a treatment involving all the major disciplines contributing to the subject."

The eight disciplines or fields of study selected for treatment are represented in the published proceedings as follows: landforms—L. Starkel (19 pp.); glaciology—G. Manley, R. P. Goldthwait (20 pp.); sea level changes—S. Jelgersma (18 pp.); desert evolution—K. W. Butzer (12 pp.); ocean sediments—J. D. H. Wiseman (15 pp.); pollen and other botanical evidence—B. Frenzel, C. J. Heusser, M. E. S. Morrison, D. Walker (with D. M. Churchill and N. T. Moar) (56 pp.); paleolimnology—H. E. Wright, Jr. (17 pp.); meteorological appreciation—H. H. Lamb (with R. P. W. Lewis and A. Woodroffe), J. S. Sawyer (55 pp.).

We may ask to what extent each of these disciplines succeeds in contributing in broad terms to a distinct, mutually consistent picture of climatic sequence and change, and the degree to which the integrated picture thus achieved advances our previous understanding of climate during the Holocene period, essentially the stated objective of the program.

This is, as Sheppard acknowledges, an ambitious aim the full realization of which is not realistically possible. The climatic picture continues to be clearest in the geographical area of the British Isles and northern Europe, where the most investigation has been carried out, and decreasingly clear in the geographically more remote regions roughly in proportion to the amount of pertinent investigation completed. This in turn is a function in part of the type and accessibility of local evidence. The London conference contributes most to the outline of the climatic picture in some of the regions where it previously was less well established. In those limited areas or respects in which conflicting evidence emerges it is not sufficiently reliably established or confirmed to be accepted as finally changing the previously established picture.

Of the eight fields of study represented, two—landforms and botanical evidence—contribute practically the complete picture of Holocene climate in Europe presented in the table here shown, together with the suggestion of shorter climatic oscillations that are not sufficiently reliably fixed or correlated to be specified in the table. The same two disciplines contribute the evidence indicating that at least in North and South America the climatic sequence seems to have paralleled closely that indicated for Europe.

Techniques for the analysis of the evidence from sea-level changes, desert evolution, ocean sediments, and lake sediments (paleolimnology) have not been applied or perfected to the point where these disciplines can contribute reliably to the picture of Holocene climate, although all four disciplines give promise of significant potential contribution. Glaciology can contribute important information, but it is difficult to interpret because individual glaciers are so variously affected by local topography that only statistical evidence from a group of glaciers can be accepted at face value.

In the field of meteorological appreciation, Lamb, on the basis of all available past and present climatic information, synthesizes probable mean wind charts for critical epochs of the Holocene period. These reconstructed circulation patterns probably are quite realistic, and lend themselves to further clarification of the contemporary climatic conditions, notably with respect to the probable distribution of precipitation.

By way of conclusion, it must be said that the results of the conference as set forth in this volume do not radically change or extend our picture of Holocene climate. On the other hand, the volume certainly does to a significant degree confirm and fill in many details. Its greatest value is that it compiles in one authentic and readily available source most of what is known from all fields of study concerning climatic change during the Holocene period, including an evaluation of the present and potential contributions of each field to this knowledge, and a rather complete referencing by field of the hundreds of publications and journal articles which constitute the widely scattered source material.

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Outline, by periods, of the Holocene climate in Europe.

8300–6200 B.C., pre-Boreal, Boreal
Increasing warmth and dryness from preceding cold, wet glacial period. Then, as now, climate of eastern Europe more continental than that of western Europe.

6200–3000 B.C., Atlantic
Climatic optimum, warm and humid, with rain all year round and prolonged periods of heavy rain. Annual mean temperature 2°C higher than today.

3000–500 B.C., sub-Boreal
Periodically warm with cooler intervals, averaging less warm than the climatic optimum. Rather dry but with considerable variation of humidity.

500 B.C.–A.D. 200, Early sub-Atlantic
Marked climatic cooling to pre-Boreal conditions, cooler than today. Snowy, frosty winters and cool, wet summers. Increasing glaciation.

A.D. 200–1000, Late sub-Atlantic
Climate becoming warmer and drier. Glaciation in retreat. Conditions by late period in northern Europe temporarily more favorable to human activities than today.

The Fortunes of the ARS

The Agricultural Research Service. ERNEST G. MOORE. Praeger, New York, 1967. xii + 244 pp., illus. $5.95. Praeger Library of U.S. Government Departments and Agencies.

The Department of Agriculture has engaged in basic research since its inception. In 1953, as part of a general reorganization, the Agricultural Research Service was formed to centralize the administration of the department's research program. Ernest G. Moore's book tells how the research of Department of Agriculture scientists resulted in improved plants and animals, ad-