

Megalithic Monuments

The Stone Circles of the British Isles. AUBREY BURL. Yale University Press, New Haven, Conn., 1976. xxii, 410 pp., illus. \$20.

Stone circles are a familiar feature of the British and Irish landscapes and, with the roughly contemporaneous megalithic tombs, have excited many a rela-

tively sober mind to speculative fancy over the past three centuries or so. They date mainly to the later Neolithic and earlier Bronze Age (from the later third through much of the second millennium B.C.). Unlike megalithic tombs, however, stone circles (and the related "henge" monuments) are an almost entirely insular phenomenon—very few examples indeed are known from continen-

tal Europe—and there is little doubt that they are an insular invention. What interest does such an arcane and geographically restricted topic have for those who are not specialists in Hiberno-British later prehistory? Potentially, a considerable amount, but before the wider implications are considered the book under review must first be considered as it was intended.

It is primarily a complete compendium of the stone circles of Britain and Ireland (and Brittany, where the only definite continental examples occur). It is emphatically not in the "lunatic fringe" category, but is professional, up to date, copiously referenced, and (at least at the gazetteer level) exhaustive. Classification, interpretation, and synthesis are attempted, with some success, but the data are not warped to fit one or another theory, conventional or fantastic. Some 900 of these sites survive in one form or another or are well attested if now destroyed, and they include considerable variety of form, size, and date. This helps to explain why such a volume has not been compiled before. Burl provides a well-reasoned (if schematic, because of paucity of data) chronological argument, provides a critical review of proposed classifications, and considers from time to time the problems of relationships between regions.

For the wider audience the interest of the book lies in the cautious attempts at interpretation and explanation. In the chronological section (pp. 45–49) Burl argues that the more complex forms—flattened circles, ovals, and egg shapes—as classified by Alexander Thom (see his *Megalithic Sites in Britain*, Clarendon, 1967)—are later in the series. Thom has argued that the planning of these forms involved relatively sophisticated geometric principles, and Burl accepts that view (though with some reservations—pp. 43–45). Burl also accepts at least the simpler astronomical alignments (pp. 50–54), though with disappointingly little discussion. In these conclusions, Burl is probably with the majority of archeologists (and, apparently, astronomers).

On sociopolitical interpretation he has greater problems. This seems odd at first sight, but the number of Neolithic and Bronze Age habitations in Britain and Ireland is very few, and they are far outnumbered by stone circles, henges, megalithic tombs, assorted barrows, and other sites of "ritual" (beloved archeological term) rather than residential or utilitarian aspect. Colin Renfrew (*Antiquity* 47, 221 [1973]) has suggested that henges and stone circles were focal cen-



King Arthur's Round Table, Penrith, Westmorland, viewed from the southwest. The central area was about 50 meters across. A cremation trench was discovered near the center. This photograph was taken in 1935. The site was subsequently excavated and was destroyed by road improvements. [From *The Stone Circles of the British Isles*]



Midmar Kirk, Aberdeenshire, viewed from the north. The recumbent stone is flanked by tall pillars. The heights of the other stones are graded. The site now stands in a churchyard, "a good example of the 'christianisation' of a pagan monument." [From *The Stone Circles of the British Isles*]

ters for "group-oriented chiefdoms"; Burl appears to disagree on p. 71, but to agree on p. 139.

On the other hand, Burl mentions in a number of places recent or current folklore and folk customs associated with sites, and place-name evidence (for example, p. 241) suggestive of their original purpose. On pp. 79–80 he approvingly cites evidence suggesting continuity from the later Neolithic to the Iron Age culture of the Celts. These scattered suggestions indicate that there was a coherent body of scientific and technological knowledge, albeit partly obscured by "religious" symbolism, continuing from the third millennium B.C. to the advent of Christianity and even, less coherently, beyond. It was not the purpose of his book to do so, but it is a pity that Burl did not pursue this in the framework of his suggestion (p. 86) that "primitive" or "simple" material culture is not necessarily incompatible with intellectual interests or abstract thought, for in many ways these inferences and observations are more important than the anthropologically inspired problem of attempting to identify sociopolitical forms. For the authority of respected astronomers (such as Hawkins and Hoyle) and engineers (such as Thom) has persuaded many archaeologists that supposedly supine and uncouth "barbarians" practiced quite sophisticated astronomy, surveying, planning, and construction. From this it is reasonable to infer, further, that these societies must have had some effective medium for transmitting precise information over considerable periods of time and, presumably, some well-developed, well-understood, and coherent system of symbols.

These implications derive in no way from "anthropological theory," but from essentially empirical observation of actual sites and inductive reasoning from the data. Nor do they have any necessary relationship to this or that "type" of sociopolitical organization. Indeed, it is becoming increasingly clear that several major innovations were made by "barbarian" rather than "civilized" societies, and archaeologists must come to understand that their traditional obsessions with the so-called "early civilizations" will not provide all the keys to the major human achievements of the past five millennia or so. This book takes us a little further in the right direction toward a reevaluation of traditional "cultural evolution."

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22 JULY 1977

Plasma Physics

Theory of Turbulent Plasma. V. N. TSYTOVICH. Translated from the Russian edition (Moscow, 1971) by David L. Burdick. Consultants Bureau (Plenum), New York, 1977. xviii, 536 pp. \$45. Studies in Soviet Science.

Plasmas support a wide variety of collective oscillations, and the term plasma turbulence has come to mean strong, broad-band excitation of one or more of these modes of oscillation. The present volume is a comprehensive review of the subject by an author who has made a number of contributions to the development of the theory of turbulent plasma. With the exception of the final chapter, which covers developments in the theory of strong Langmuir turbulence (cavitons and solitons) during the period 1972–1975, the book covers what was known about the topic of nonlinear wave-particle and wave-wave interactions prior to 1972. The general outline of the theory was well developed by that time, and, although the material is now five years old, it is not seriously out of date.

Although the bulk of the material discussed in the book is already available in the research literature, the explanations are more detailed than those found in a typical research paper, and the book could well serve as a reference text for an advanced seminar. It begins with a brief review of the linear dispersion relations of the more important plasma modes of oscillation and proceeds to a development of correlations, quasilinear theory, and resonance broadening. The treatment of these topics follows what are by now well-developed lines. This section is followed by a short, but very clear, treatment of the excitation and dissipation of turbulent fluctuations. The discussion is limited to the major types of destabilizing effects, beams, constant electric fields, and anisotropies of the distribution functions. The information contained in the introductory chapters is then applied to the problem of determining the spectrum of stationary plasma turbulence.

The remaining half of the book is devoted to several processes that result from plasma turbulence, stochastic acceleration, enhanced radiation output, and the scattering of electromagnetic radiation. Not only are these subjects of importance in laboratory plasma physics, they may well be intimately connected to the energy output of some of the more exotic astrophysical objects.

This monograph is an excellent suc-

cessor to the partially dated and much slimmer volume on the same subject by Kadomtsev. At some points one might wish for a bit earlier recourse to numerical evaluations and less emphasis on the more restricting analytical approximations, but this is a minor point. The book should be of interest to those concerned with either laboratory or astrophysical plasma turbulence.

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Dendroclimatology

Tree Rings and Climate. H. C. FRITTS. Academic Press, New York, 1976. xiv, 568 pp., illus. \$35.

Since the pioneering work of A. E. Douglass, the founder of the Laboratory of Tree-Ring Research in Tucson, dendroclimatology has become a major source of information about climatic change on the time scale of decades to centuries. Replicated tree-ring chronologies from over 50 locations in the western United States are yielding maps of the past climatic patterns from the eastern Pacific Ocean and North America.

The production of these maps is largely the result of a 15-year research program directed by H. C. Fritts and his colleagues V. C. LaMarche, C. W. Stockton, and T. J. Blasing. Their research has involved three phases of analysis in working from the development of a data base to the final calibration of the data in climatic terms.

First, Fritts assembled tree-ring chronologies from a geographic array of trees located at climatically sensitive sites.

The second phase focused on biological studies of the relation of tree-ring widths to both the aging of trees and the changes in external climatic variables. Fritts developed computer programs for standardizing his data in order to account for the allometric decrease in ring widths as a tree ages. He then constructed response models that show what combination of temperature and precipitation variations causes changes in the standardized widths.

In the final phase, Fritts adapted multivariate statistical techniques in order to estimate past climatic values from dendrochronological data. Maps of these estimates show the synoptic patterns of climates for selected years, pentads, and decades during the past 300 years.