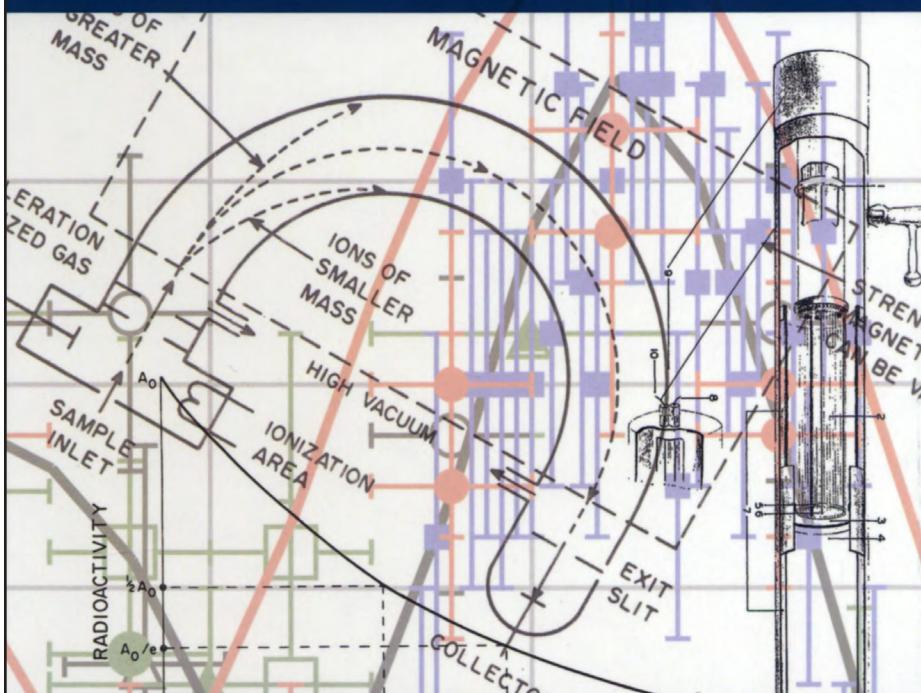


Second Edition

RADIOCARBON DATING

An Archaeological Perspective



R. E. Taylor and Ofer Bar-Yosef

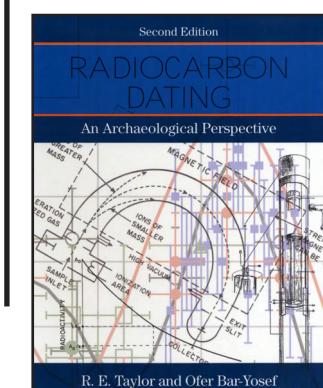
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Reviewed by John P. Hart, Research and Collections Division, New York State Museum, Albany.

Over the last several decades archaeology as practiced in North America and portions of Europe has become a fractured discipline. Various theoretical schools have arisen with divergent goals, methods, and traditions. Among these are some that claim a strong affiliation with scientific disciplines, others with cultural anthropology or the humanities, and others with schools of European philosophy. Despite the fractured nature of the discipline, a fundamental need of most archaeologists is the ability to anchor their research and narratives in time—chronology building remains a fundamental activity for much of the discipline.

Prior to the advent of radiocarbon dating, various methods and techniques were developed, such as seriation, to place regional archaeological assemblages in relative chronologic order. Regional culture historical schemes were developed and continuously revised to provide temporal (and spatial) control over the archaeological record. These schemes were subjective, generally based on a single archaeologist's enumeration of formal attributes and subsequently subjectively revised by other archaeologists as new sites were investigated.

When radiocarbon dating came on the scene in the 1950s, suddenly there was an independent means of estimating the age of archaeological deposits. No longer was chronology building necessarily a regional phenomenon based directly on the archaeological record and its subjective interpretations. Rather it could now be based on an independent methodology grounded in physical laws, principles, and theory within the 40,000–60,000 year range of applicability. This revolutionized the practice of archaeology and, as R. E. Taylor and Ofer Bar-Yosef argue in this book, allowed the development of a global archaeology.

As amply covered by Taylor and Bar-Yosef, radiocarbon dating methods and techniques have changed markedly over the past 60 years. Particularly important has been the development of calibrations to account for temporal fluctuations in atmospheric ^{14}C resulting in the ability to assign calendrical date ranges to radiocarbon age estimates (the second radiocarbon revolution). Of equal importance has been the development of accelerator mass spectrometry (AMS) dating, requiring only milligram-sized samples thus allowing the direct dating of organic items of chronological interest (the third radiocarbon dating revolution). Archaeologists can now assess chronological trajectories of specific categories of material culture over large areal extents. No longer is it necessary to rely on subjective culture-historic schemes to control chronology. Radiocarbon dating has become an indispensable tool for archaeologists researching pre-contact societies in the midcontinent.

Despite the dependence of archaeologists on radiocarbon dating, few archaeologists receive intensive training in the theory and methods behind obtaining radiocarbon age estimates.

I surveyed the course catalogues of major Ph.D. granting anthropology departments in state universities across the midcontinent, and did not find a single course devoted exclusively to radiocarbon dating. One department offers a geochronology course that includes coverage of radiocarbon dating, another a course on Quaternary environments that includes coverage of radiocarbon dating, and a third has offered a short course on archaeological dating methods in the last few years. While radiocarbon dating may be included as a unit in methods survey courses, it seems that most archaeologists obtain advanced degrees without a firm grounding in this indispensable tool.

It is fortunate, then, that a second edition of this book is now available. While most of the chapters contain updates of the original 1987 edition authored by Taylor, with the addition of Bar-Yosef as a second author, this second edition includes two new chapters of examples on the application of radiocarbon dating in archaeological research. This book provides a firm foundation in the history, theory, methods, and techniques of radiocarbon dating.

Much of the book is given over to understanding radiocarbon dating anomalies and how those anomalies can be quantified and corrected. The authors identify four potential sources of anomalous age estimates: contextual, compositional, systematic, and measurement. As Taylor and Bar-Yosef repeat several times through the volume, they consider that “the most common source of anomalous ^{14}C age determinations is a failure to define correctly and explicitly the physical association or relationship of a specific organic sample and the ^{14}C age obtained on it with the type of archaeologically related object or phenomena for which a chronometric age is desired” (p. 43). In other words, these are errors of association made by archaeologists. While many of the other sources of anomalies can be dealt with in the laboratory or through appropriate calibrations, this source falls squarely at our feet. One can almost feel the authors’ frustrations with those of us who want to blame the lab rather than themselves when they receive what they consider anomalous dates.

While dealing with a highly technical subject, the volume is very approachable for those with basic groundings in the physical sciences. The first chapter provides a comprehensive summary of the rest of the volume. It is well-worth reading in and of itself to learn or refresh one’s knowledge about radiocarbon dating. The remaining chapters need not be read in order. Rather each provides an extensive and comprehensive treatment of a particular broad topic and its various components that can be read as a stand-alone primer. The two chapters of archaeological examples provide a wide-range of radiocarbon-dating applications that have resolved sometimes long-standing chronological issues.

The volume is largely up-to-date providing important insights into various contemporary issues surrounding radiocarbon dating. A few areas receive no attention or less that I would have liked. These include chronometric hygiene, the freshwater reservoir effect on charred cooking residues adhering to pottery, and Bayesian statistics. Regardless, this is the most comprehensive treatment of radiocarbon dating in archaeology available. It is a must read for all archaeologists engaged in chronology building, and it would serve as an excellent textbook for graduate-level radiocarbon-dating courses in archaeology if such courses are offered.