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California Radiocarbon Dates. Fifth edition.

Gary S. Breschini, Trudy Haversat, and Jon Erlandson, Compilers. Salinas: Coyote Press, 1988, vi + 119 pp., 30 figs., 1 table, \$5.95 (paper).

Review by:

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California Radiocarbon Dates represents an ongoing database project of the compilers. In this edition, data on 2,681 ¹⁴C values--up from 2,330 in the previous edition--have been assembled. The primary listing of the dates uses trinomial site designations (state/county/site number) with the counties listed in alphabetical order and sites listed in numerical order within the county grouping. Those dates lacking a site number are listed at the end of each county group of dates. In addition to the trinomial designation ordering, other information provided in the data record includes the conventional B.P. age expression (age ± range), the "date" in A.D./B.C. notation, the laboratory number, sample material, reference to end notes, provenience (provenance), collector/submitter, and a source reference.

Following the compendium of individual dates are tables and figures summarizing the assembled dates. These summaries provide information on such things as the number of dates and number of ¹⁴C-dated sites in each county and then, through a series of histo-

grams, lists, in 250-year increments, the dates from each county--or in a few cases, dates from individual sites with large suites of dates (e.g., CA-ORA-119 with 25 dates)---out to 10,000 years B.P. A brief listing of additional comments on individual dates, a set of references to the database itself and an annotated bibliography dealing with the interpretation of ¹⁴C data are also included.

This compendium constitutes a significant reference resource whose main virtue is that it provides a framework within which a complete database for California ¹⁴C dates can be developed. There is currently an international effort being coordinated by Renee Kra, the Managing Editor of *Radiocarbon*, to get all ¹⁴C data on some type of computer-based system. However, this will be an extremely slow process as funding for such enterprises is very limited. The efforts of the compilers of *California Radiocarbon Dates* should be applauded and supported by everyone professionally interested in California archaeology.

Support means having archaeologists send to the compilers lists of ¹⁴C dates obtained as a result of fieldwork. However, even above the database itself, the annotated bibliography compiled by Jon Erlandson at the end of the booklet should be included on the required introductory reading list of all first-year graduate students in archaeology. They should also be required to read the last sentence of his introduction: ". . . a fundamental tenet in modern archaeology: don't rely on a single ¹⁴C date . . ."

In scanning the entries, one should note a few issues raised by the format. These comments are not directed at the compilers, who were at the mercy of their sources, but are for the users and contributors to future editions. In the compendium, dates are expressed with both B.P. and A.D./B.C. notations. Before 1976, all labs published their dates in this manner using the rela-

tionship 0 B.P. = A.D. 1950. After 1976, this practice was discontinued because of the recognition of secular variation effects leading to the need to "calibrate" ^{14}C values. Some of the primary values in this compendium have been listed in their calibrated form, that is, interpreted in light of ^{14}C /tree-ring-dated samples such as those presented in the 1973 MASCA (Museum Applied Science Center for Archaeology, University of Pennsylvania) *Newsletter*. (The term used in the compilation is "corrected" but the usual term is "calibrated." "Corrected" usually refers to ^{14}C values adjusted for reservoir effects, such as upwelling for marine shells. Also, the reference to the MASCA calibration data is to a reprinted source, the original calibration data were published in the MASCA *Newsletter*.)

This reviewer would suggest that the use of calibrated ^{14}C values generally be discouraged in New World archaeological studies--except where it is directly relevant to an issue being addressed. Although it originally was suggested as a means of reflecting geophysical reality (and advocated by this reviewer), it has tended to create more confusion than clarification. Where dendrochronological data are widely available (such as in the U.S. Southwest), where calendar data are employed (as in the Maya region) or where the ^{14}C values are approaching contact times, there is obvious justification for adjusting the ^{14}C values to get them in line with calendric or sidereal time by calibrating in light of the ^{14}C /dendrochronological data. However, the chronologies associated with the prehistoric culture history of California do not involve the interpretation of dendrochronological or calendric data. Chronological reconstructions in California prehistory--as in most areas of the New World before European contact--have, since the early 1950s, been expressed in "radiocarbon years" not

sidereal years. For most areas of the world for the last 40,000 years, prehistoric time is ^{14}C time. My suggestion in future editions is to list only the B.P. value using the conventional expression. It should be mentioned that this includes the use of 5,568--not 5,730--as the ^{14}C half-life. One commercial lab has released dates calculated with the 5,730 half-life. This introduces additional unnecessary confusion.

Another problem highlighted by this compendium is the nature of "modern" ^{14}C values. It might be explained that the term "modern" can mean two things in radiocarbon jargon. In the strict sense, "modern" refers to any sample whose count rate is statistically undistinguishable from the modern reference standard used in ^{14}C work, that is, a sample whose ^{14}C activity indicates an age of 0 B.P. or A.D. 1950 (± 100). Labs usually assign the age "less than 150 years" to such a sample. However, because of several geophysical factors, there is another meaning of "modern." Over the last three centuries, ^{14}C activity in the atmosphere has been relatively "noisy." Ages of, for example, 160 ± 70 , 190 ± 60 , or 240 ± 50 ^{14}C years cannot be assigned a true or calendar age to better than a range of 0-300 years. (In theory, there are ways of accomplishing this by a process called "wiggle matching." However, it is almost always not possible or practical to carry this out because an appropriate sample is usually not available (a wood sample with a minimum number of rings) and a relatively large number of samples are required to be processed). Thus, in practice, "modern" from a ^{14}C perspective is anything from about A.D. 1650 to the present. One should keep this in mind when referring to any ^{14}C value of 300 (± 100) years or less.

The authors of this compendium are to be congratulated for their initiative in assembling this very valuable reference work

which should increase in usefulness as more and more ^{14}C data from California are included in future editions. As they note, it is unfortunate that all labs have not made available their unpublished dates from California. However, it is the policy of some labs, including the University of California, Riverside, laboratory, not to prepare for publication in *Radiocarbon* ^{14}C values for which there is not existing or in press published discussions of the significance and context of the dates. One of the results of an archaeology which tends to operate in a cultural resource management environment is

that many ^{14}C dates lack any kind of documentation in the open literature. Such a situation is reflected in the comment of the compilers (p. v) that more than 10% of the dates in the list are missing site numbers. In San Diego County, they note that nearly 40% of the dates are not accompanied by site designations--down from 50% in the previous edition.

A compendium such as *California Radiocarbon Dates* provides a vital function to which all archaeologists conducting studies in California should contribute for future editions.

