[RADIOCARBON, VOL 24, No. 2, 1982, P 103-150]

Radiocarbon

1982

CALIBRATION OF RADIOCARBON DATES:

Tables based on the consensus data of the Workshop on Calibrating the Radiocarbon Time Scale

JEFFREY KLEIN*, J C LERMAN**, P E DAMON**, and E K RALPH*

A calibration is presented for conventional radiocarbon ages ranging from 10 to 7240 years BP and thus covering a calendric range of 8000 years from 6050 BC to AD 1950. Distinctive features of this calibration include 1) an improved data set consisting of 1154 radiocarbon measurements on samples of known age, 2) an extended range over which radiocarbon ages may be calibrated (an additional 530 years), 3) separate 95% confidence intervals (in tabular from) for six different radiocarbon uncertainties (20, 50, 100, 150, 200, 300 years), and 4) an estimate of the non-Poisson errors related to radiocarbon determinations, including an estimate of the systematic errors between laboratories.

INTRODUCTION

It is now quite generally accepted that "conventional" radiocarbon dates need to be "calibrated" because of temporal variations in the radiocarbon content of atmospheric carbon dioxide. The discovery of this phenomenon was made largely by the pioneering work of de Vries (1958; 1959) and Willis, Tauber, and Münnich (1960), and subsequently has been carried on by more than a dozen radiocarbon laboratories worldwide (for a review see Damon, Lerman, and Long, 1978). The assessment of these variations relies on the measurement of ^{14}C activity in samples of known age. Dendrochronologically dated wood has proved to be an ideal material for such measurements, and currently all radiocarbon calibrations are based on measurements of ^{14}C activity in wood. The longest chronology extant is that of the bristlecone pine, resulting from the efforts of Schulman (1956) and Ferguson (1969; 1970; 1972). It reaches continuously to 8681 years ago, and to 8580 years ago with sufficient material to allow radiocarbon dating. This work includes measurements on wood as old as 8000 years.

Many calibrations have appeared during the past 13 years (Suess, 1979; 1970a; 1967; Clark, 1980; 1979; 1975; McKerrell, 1975; Damon *et al*, 1974; Ralph, Michael, and Han, 1973; Switsur, 1973; Michael

* Department of Physics, University of Pennsylvania, Philadelphia, Pennsylvania 19104.
** Laboratory of Isotope Geochemistry, Department of Geosciences, University of Arizona, Tucson, Arizona 85721

and Ralph, 1972; Clark and Renfrew, 1972; Damon, Long, and Wallick, 1972; Wendland and Donley, 1971; Lerman, Mook, and Vogel, 1970; Ralph and Michael, 1970; Stuiver and Suess, 1966). Although all reflect similar long-term changes in atmospheric radiocarbon concentrations, they differ significantly in their treatments of shorter period variations. This diversity of available calibrations and the apparently conflicting results obtained when calibrating dates using one in preference to another has resulted in a suspicion on the part of many archaeologists regarding calibration, in particular, and radiocarbon dating, in general. Consequently, in 1978, it was suggested to the USA National Science Foundation that it was time to attempt a consensus among the divergent efforts of the many laboratories then involved in calibration research. With this as a goal, a workshop was held in Tucson, Arizona in early 1979, entitled, "Workshop on the Calibration of the Radiocarbon Dating Time Scale" (Damon *et al*, 1980; Michael and Klein, 1979). This work is largely the implementation of the decisions reached at that meeting.

The Workshop participants decided to provide a calibration table suitable for the calibration of individual or "single" radiocarbon dates. A "single radiocarbon date" is defined as any radiocarbon date that is not associated with another radiocarbon date by a tight, independently determined relative chronology. Such a chronology is exemplified by tree rings, where the number of intervening rings determines the relative ages of samples, and by stratified samples, where the rate of stratification is known independently of the radiocarbon ages of samples contained therein. Included in the category of "single radiocarbon dates" are series of dates from samples thought to be coeval, or series in which the temporal sequence, or even the relative ages of its members is unknown.

A second decision of the participants of the Workshop was to provide the "user" with a realistic assessment of the precision of calibrated dates. A consideration of many factors is necessary in the estimation of this precision. These include the precision with which the sample's activity has been measured, involving not just the "counting" statistics quoted by the measurement laboratory, but also an estimate of the true reproducibility of the measurement, *ie,* the degree to which a particular result can be repeated by the same laboratory or any other laboratory on subsequent measurements. In addition, there is the precision to which the calibration function is known near a particular calendric date. This depends on the quantity and quality of data used in the construction of the calibration. Finally, there is the "shape" of the calibration "curve" in the region in which it is being employed. This factor is often the most influential in determining the magnitude of the uncertainty of a calibrated date, and although its importance has been recognized for some time (Renfrew and Clark, 1974; Grey and Damon, 1970) it is often ignored in the routine calibration of dates.

These objectives were implemented by providing a range of calibrated dates, representing the 95% confidence interval, for each radiocarbon age of specified precision. An advantage of specifying an interval, rather than a midpoint and uncertainty, hinges on the fact that many confidence intervals are asymetrically related to the value obtained from simply calibrating the ^{14}C date without consideration of uncertainties.

THE DATA

This calibration is based on the ^{14}C activity measurements performed by the radiocarbon laboratories at the Universities of Arizona, Groningen, California at La Jolla, Pennsylvania, and Yale, on 1154 samples of dendrochronologically dated wood, principally *Pinus longaeva* and *Sequoia gigantea* (bristlecone pine and giant sequoia). The data set consisting, for the most part, of an updated version of previously published data (current data sets in preparation by individual laboratories), was prepared for the "Workshop on the Calibration of the Radiocarbon Dating Time Scale." Only measurements on samples of wood containing 20 or fewer rings were used in this work so as not to attenuate significantly through averaging, variations occurring on the time scale of the order of 100 years. Beyond this consideration, no selection of the data was undertaken.

As one of the principal objectives of this analysis has been to understand more fully the nature and causes of the variability of radiocarbon dates, the data were examined carefully for signs of non-random errors. Much to our surprise and despite previous findings to the contrary (Damon, Lerman, and Long, 1978; Clark, 1975; Damon, 1970), there is significant evidence of systematic differences between the laboratories represented. Of the five laboratories, one shows an average systematic difference of approximately six per mil, roughly 50 radiocarbon years, significant at less than the 1% level. The other four laboratories agree within experimental uncertainties. Independent comparisons with a sixth laboratory have resulted in similar conclusions (Stuiver, pers commun, 1981). Systematic differences were determined by calculating residuals of each data set with respect to the calibration function calculated on the combined data set. If no systematic differences had existed, then the sum of residuals would have been consistent with zero for all laboratories; it was not. A table of these differences was reported earlier (Klein *et al,* 1980), and is included here with slight modifications (see Table 1). Since it is unlikely that the systematic errors between other radiocarbon laboratories are, in general, less than those encountered here (International Study Group, submitted for publication), we decided to leave the data as they were and to include the uncertainty related to interlaboratory standardization within the calibration uncertainty.

CONSTRUCTION OF TABLES

Though the method used to construct this calibration has been outlined elsewhere (Ralph and Klein, 1979; Klein *et al,* 1980) and will be described in more detail in a forthcoming article, it is briefly described here. The procedure may be divided into three steps: a "global" regression which describes the long period (of the order of a few thousand years) secular changes in the atmospheric ^{14}C concentration; a series of short term intervals called "shingles" which describe variations of a few hundred years; and finally, the construction of the table itself from the combination of these functions.

First, paired dendrochronologic ages and radiocarbon ages are scaled logarithmically so that each ranges over the interval [−1,1]. This is done to avoid the pathology common with polynomial regressions, namely the dominance of measurements at large values of the independent variable in the determination of the coefficients of the function. Next, each measurement is weighted by an estimate of the inverse of its variance. But, as it is widely accepted that the uncertainties quoted by radiocarbon laboratories, based only on counting statistics, are underestimates of the "true" variability, the laboratory uncertainties were increased under the following assumptions: 1) the additional sources of variance are independent of the Poisson error of the activity measurement; 2) this added variance is of approximately the same magnitude for samples of similar age; 3) these "extra" components increase with the age of the sample, as demonstrated by the poorer reproducibility of radiocarbon dates for older samples (Currie and Polach, 1980; Pearson *et al,* 1977; Clark, 1975; Currie, 1972). Consequently, the "counting" variance was increased by an additive term which was allowed to be a slowly increasing function of the age of the sample, hence:

$$w_i = \frac{1}{\sigma^2_i + \left(40 + \frac{x_i}{150}\right)^2}$$

This has the effect of increasing the smallest error to approximately 60 years for samples less than 1000 years old, and to approximately 115 years for samples with ages greater than 6000 years. These figures compare favorably with the error estimates of Otlet *et al* (1980), *viz:* 50 years for samples less than 5000 years and 100 years for samples less than 10,000 years old, and the estimates of Clark (1975), *viz:* 50 years for samples less than 3000 years and 95 years for samples with ages greater than 3000 years.

Finally, the weighted, scaled radiocarbon ages are least squares regressed against their calendric (dendrochronologic) ages using a polynominal basis to obtain the long period trend curve. Polynominals were chosen since 1) a sample's radiocarbon age is, to first order, linearly related to its chronologic age, and 2) though the difference between a sample's uncalibrated age and its true age is bounded, and described reasonably well by a sine function (Damon, Long, and Wallick, 1972; Houtermans, 1971), a polynomial fit is better.

With Fisher's F-test as a criterion, the "best fit" was determined to be a polynominal of order six. Because of its low order, this function is insensitive to short-period variations in the ^{14}C inventory and, for the most part, reflects variations resulting from changes in the earth's magnetic field. (See, eg, Sternberg and Damon, 1979; Lingenfelter and Ramaty, 1970; Damon, 1970; Bucha, 1970; Lal and Venkatavaradan, 1970; Suess, 1970b.) This function and the data are plotted in Figure 1.

The second step involves a piecewise Fourier analysis of the residuals around the polynominal regression. A piecewise regression, *ie,* one that divides the data into a number of similar intervals instead of considering the data set as a whole, was adopted because of several distinctive features observed in the variations of atmospheric ^{14}C. Such characteristic changes are represented by the variations in ^{14}C concentration occurring during the Spörer, Maunder, and Wolf minima (Stuiver and Quay, 1980a; 1980b; Damon, Long and Grey, 1966); by those occurring in the sixth millennium BP (de Jong, Mook, and Becker, 1979; de Jong and Mook, 1980), and by the peaks at 200 years, 150 years, etc, observed in the power spectra of Fourier analyses performed by various investigators (Neftel, Oeschger, and Suess, 1981; Suess, 1980; Lazear, Damon, and Sternberg, 1980; Siegenthaler, Heimann, and Oeschger, 1980; Houtermans, 1971). Damon (1977) has noted that although characteristic periods appear in the spectral analyses of atmospheric ^{14}C, their phase relationships are different depending upon the section of the 8000-year record analyzed. With this in mind, it seemed prudent to divide the entire time period into short segments and consider the fluctuations individually in each. Consequently, the calendric time scale was divided into 28 shingles, each 500 years long, and each overlapping the previous and next shingle by 250 years (50% overlap each end, 100% overlap for the entire shingle). Two Fourier analyses were carried out to a minimum period of 65 or 110 years, depending on the number of measurements in the shingle. The minimum periods were chosen with consideration of the attenuation factors predicted by various models for changes in the atmospheric ^{14}C activity resulting from changes of various durations in the production-forcing function (Oeschger *et al,* 1975; Houtermans, 1966). Such models predict attenuation factors on the order of 25 times for variations in production lasting less than 100 years. The result of these procedures is shown in Figure 2.

Two analyses were performed in order to assess the effects of outlying points on the calibration function. The first analysis used the unmodified data base as described in the section on data, whereas the second analysis used a "winsorized" data set in which the residuals used for winsorization were taken with respect to the function calculated on the unmodified data. "Winsorization" is a process which reduces the effect of a few aberrant measurements by limiting the effect on the mean of a single outlying point to less than $\sim 2.56s/n$, where s is the standard error estimated from the fourth quintile of the variance of the data, and n is the number of points in the interval. Winsorization, as employed here, is described elsewhere (Dixon, 1960). Winsorization was used instead of a simple rejection of "outlying" points for the following reasons: 1) the maximum rate of change of the ^{14}C concentration is not certain, and although it appears that changes of the order of a few per mil per year seem to be

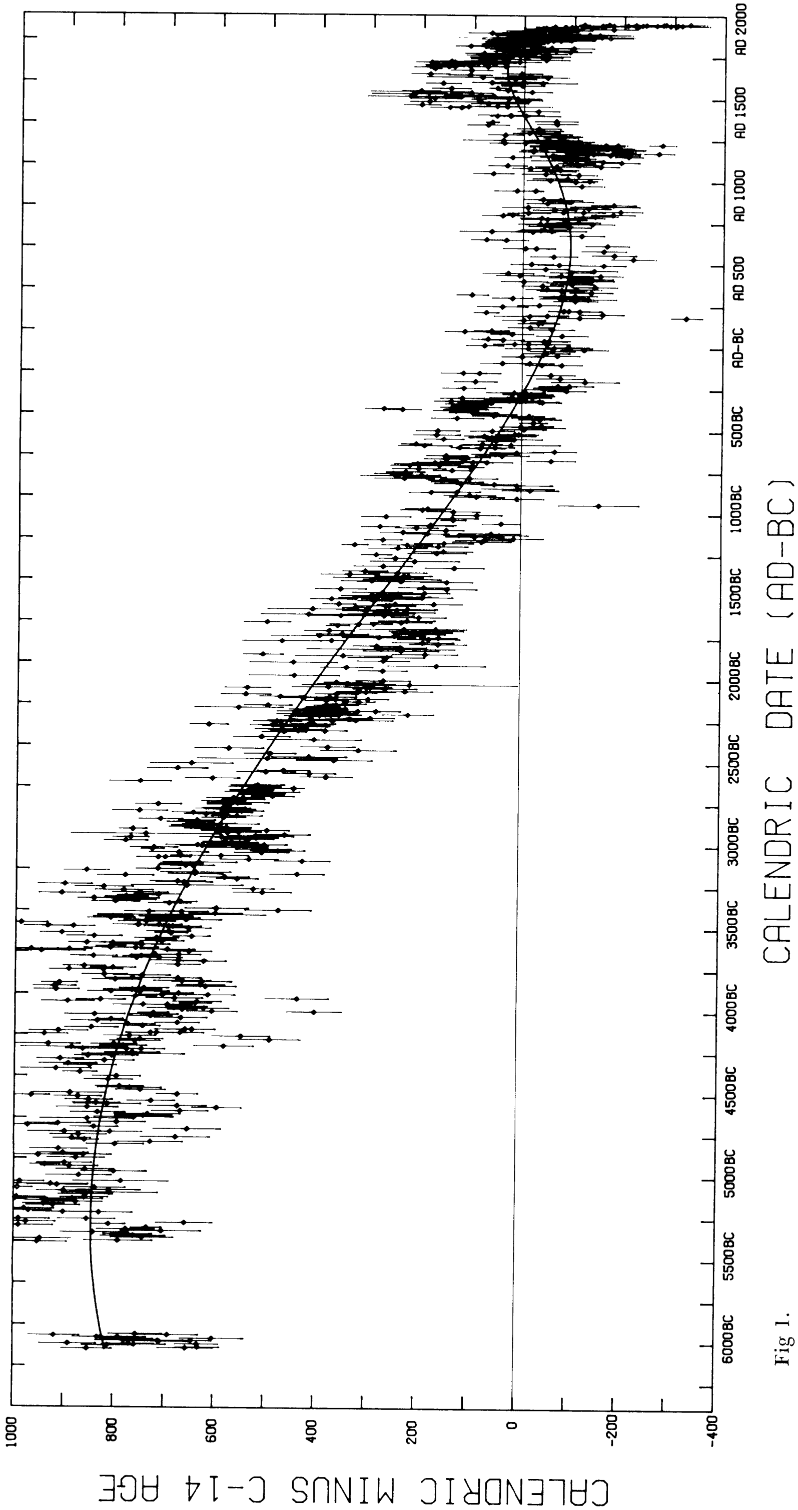
CALENDRIC DATE (AD-BC)
AD 2000
AD 1500
AD 1000
AD 500
AD-BC
500BC
1000BC
1500BC
2000BC
2500BC
3000BC
3500BC
4000BC
4500BC
5000BC
5500BC
6000BC
CALENDRIC MINUS C-14 AGE
1000
800
600
400
200
0
-200
-400

Fig 1.

the rule (Stuiver and Quay, 1980b; Burchuladze *et al*, 1980; Lerman, 1970a; 1970b; Lerman *et al*, 1969; Lerman, Mook, and Vogel, 1967), it seemed preferable not to establish an arbitrary criterion for the rejection of suspect measurements, and 2) in the assessment of the "true" errors associated with radiocarbon dates, the rejection of measurements with large residuals furthers the practice of underestimating the scatter in the data.

Another problem is caused by unequal residuals at the ends of the regression intervals (endpoint effects) and this was eliminated by using a cosine weighted average of the overlapping functions. This weight is equal to one in the center of the interval and zero at the ends, producing a final calibration function that is both continuous and differentiable.

The combined uncertainty of the calibration and the "true" uncertainty of the data are estimated by averaging the residuals of the data around the final calibration function, using the following formula:

$$\bar{\sigma}_{\text{calib}} = \sum_{\text{shingle}}^{n} \{(y_i - \hat{y}_i)^2 - \sigma^2{}_i\} \,/\, (n - a)$$

where the y(i) are winsorized, but the σ(i) are the unmodified laboratory estimates of the measurement uncertainty, and n is the number of measurements in the 500-year interval. The assumption is that

$$\text{Var}(y - \hat{y}) = \text{Var}(y) - \text{Var}(\hat{y}),$$

which is the natural decomposition, assuming the independence of y

---

Fig 1. The composite "workshop data set" is plotted against the 6th order polynominal regressed on the logarithmically scaled data. Calendric age minus conventional radiocarbon age is the ordinate; the calendric age is the abscissa. Positive values represent radiocarbon ages that are too young (too recent) and, consequently, atmospheric concentrations were greater than that of the standard atmosphere of 1890. Laboratories are identified by the following symbols: △ = Arizona; ○ = Pennsylvania; □ = La Jolla; × = Groningen; ◇ = Yale; + = Uppsala. Error bars are laboratory estimates of uncertainties calculated from counting statistics. The equation of the trend line in logarithmically compressed cordinates is:

$$\tilde{y}_i = \sum_{n=o}^{6} a_n \, \tilde{x}_i{}^n$$

where $\tilde{x}_i = \alpha \log_{10}(x_i) + \beta$,
x_i is the dendrochronologic age in years before AD 1975, and the various coefficients are defined by:

α =	0.774607	a_3 =	−1.249500
β =	−2.024200	a_4 =	0.641460
a_0 =	−0.023469	a_5 =	0.591000
a_1 =	1.205700	a_6 =	−0.344350
a_2 =	0.143050		

The predicted radiocarbon age (in years before AD 1975 and with $T_{1/2}$ = 5730 years), y_i, is obtained from $\tilde{y}_i$, using the formula:

$$y_i = \exp\left(\frac{\tilde{y}_i - \beta}{\alpha}\right)$$

and ŷ. In fact, this is not the case for linear regression which always leaves residuals correlated with the original data, but this correlation has little effect on the value of this procedure in determining the magnitude of the combined uncertainty of the calibration and the true measurement variability.

Finally, the calibration tables were derived from the composite calibration function and the combined error of the calibration and the quoted error of the radiocarbon date being calibrated. This was done by adding together the variance of the calibration (which includes not only the error of the calibration proper, but also an estimate of the non-Poisson error associated with a typical radiocarbon date) and the variance

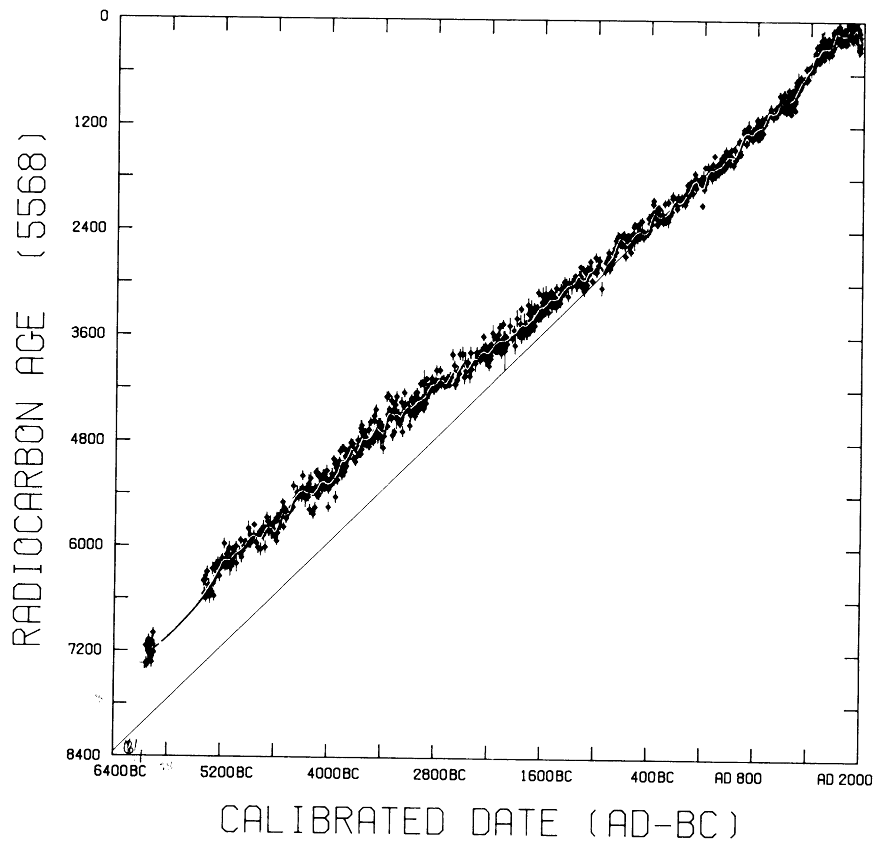

Fig 2. Graphic representation of the period covered by the calibration tables. The ordinate is the conventional radiocarbon age in years BP (1950 used as origin, ages calculated using the 5568-year half-life); the abscissa is the calendric date in years AD-BC. The same data set as in Figure 1 is plotted, but the data here have been winsorized as described in the text. The function includes both the trend analysis and the Fourier analysis of the residuals around the trend. If conventional radiocarbon years were equivalent to calendric years, all the data would fall on the diagonal line; that they do not is readily apparent. The maximum deviations between uncalibrated conventional radiocarbon dates and calendric dates occur ca 5200 BC.

of the particular date. The square root of this "total" variance was added to and subtracted from the composite calibration function, producing an uncertainty band in ^{14}C activity representative of the 95% confidence interval for a single determination of the ^{14}C activity in a sample of given age. This was converted to an uncertainty interval in calibrated age by determining the range of calendric dates for which the ^{14}C age was consistent (see Figure 3). With the exception of the post-industrial period, multiple calibration intervals were found to be statistically unjustifiable. Consequently, after combining the variances associated with the calibration and those associated with an individual date, the bound-

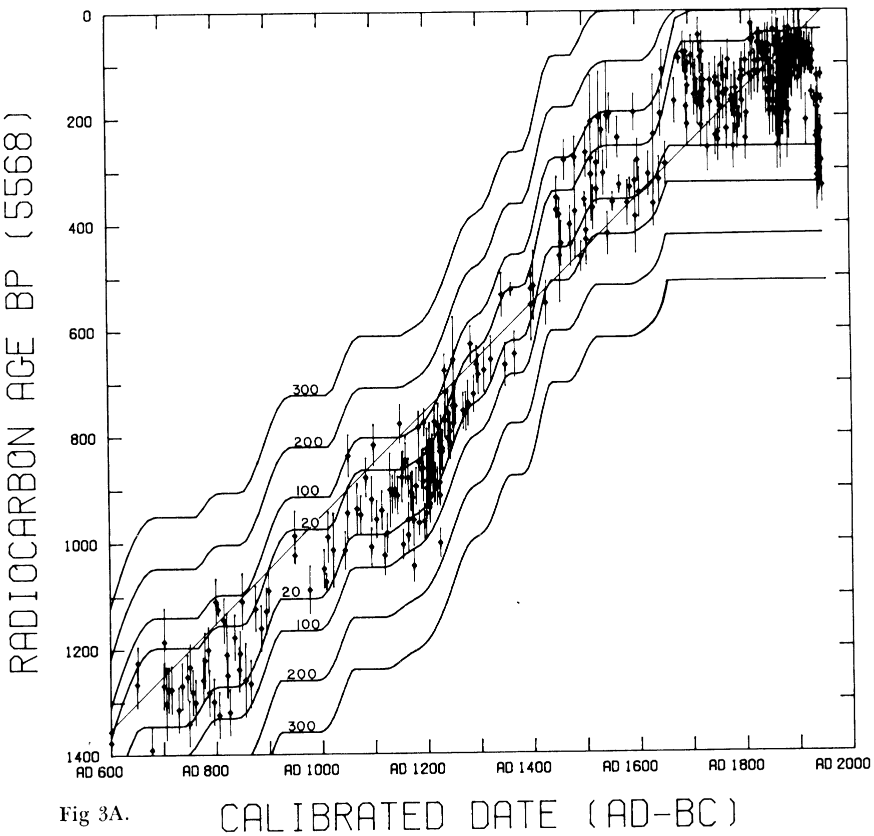

Fig 3A.

Fig 3A-G. Calibration limits (monotonic) for radiocarbon uncertainties of 20, 100, 200, and 300 years. The data are the same as in Figure 2. The error bands include both the error of the calibration and an estimate of the possible systematic differences between laboratories.

The 90% confidence intervals plotted in these graphs are intended primarily for users with multiple dates and will provide calibration intervals shorter than those obtained from the tables. To calibrate a radiocarbon date, first locate the radiocarbon age (BP 1950) on the ordinate (vertical axis), then draw a horizontal line (parallel to the abscissa) through the calibration curves. The projection onto the x-axis of the intersections of this line with the "curves" of appropriate uncertainty gives the calibrated range of the date. Note that each graph spans 1400 radiocarbon years.

ing functions were made monotonic in calendric age before the calibration interval was determined. In the final table, separate intervals are provided for radiocarbon uncertainties of 20, 50, 100, 150, 200, and 300 years. The table represents the 95% confidence interval for the calibrated date and covers the range from 7240 to 10 BP (radiocarbon years). If we assume that the source of the non-counting error is independent of the counting error and similar for samples of similar age, then the procedure described above properly accounts for this error as well.

For samples less than 1000 years BP (radiocarbon) supplementary tables are provided following the main tables. Asterisks in the main table indicate dates for which multiple intervals exist (see Figure 4). The intervals in the main table represent the extremes in range of the multiple intervals in the supplementary tables.

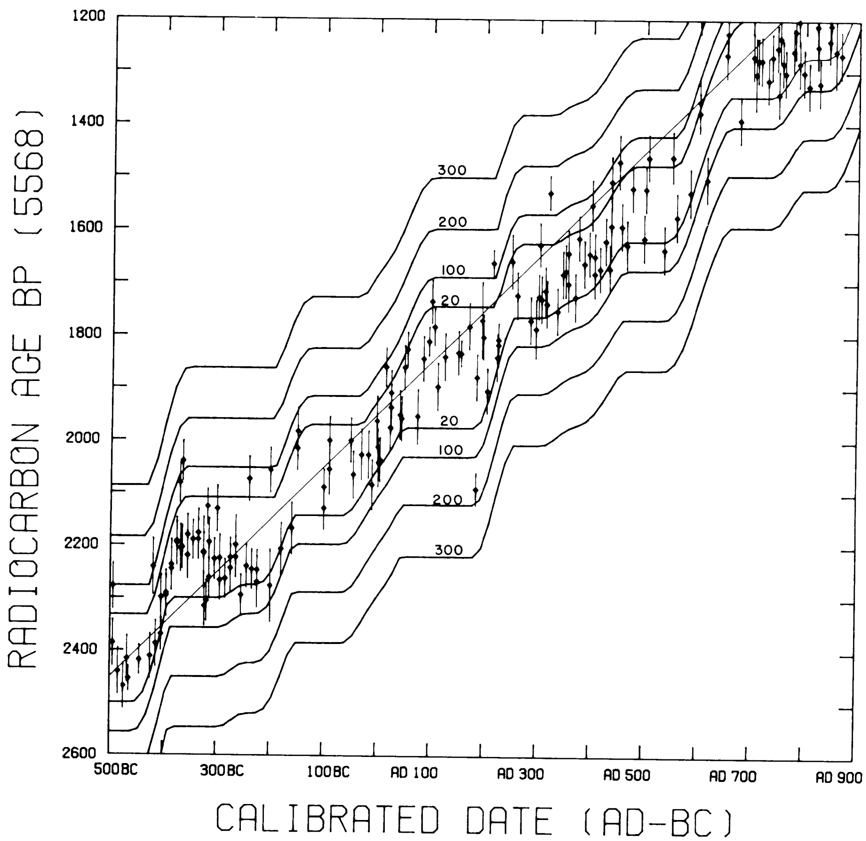

Fig 3B.

INSTRUCTIONS FOR USING CALIBRATION TABLES

The tables on the following pages are to be employed in the calibration of single radiocarbon dates. One enters the tables with a radiocarbon age (years BP, 5568-year, "Libby," half-life) and uncertainty, and leaves with a 95% confidence interval containing the "true", calendric date. The radiocarbon age, rounded to the nearest 10 years and calculated using the Libby half-life, determines the row in which the calibrated age is to be found; the uncertainty determines the columns. All dates within the table have been rounded to the nearest five years. Each radiocarbon age is calibrated to a single calendric range for ages greater than 1000 years, though multiple dates are possible for younger samples. Radiocarbon samples with uncertainties between the tabulated values should have their uncertainties rounded to the nearest tabulated value (see table footnote). Hence, a sample with a date of 1960 BP ± 30 would have a calibrated interval of 145 BC to AD 210, whereas 1960 BP ± 40 would range from 155 BC to AD 215. It will normally not be necessary to

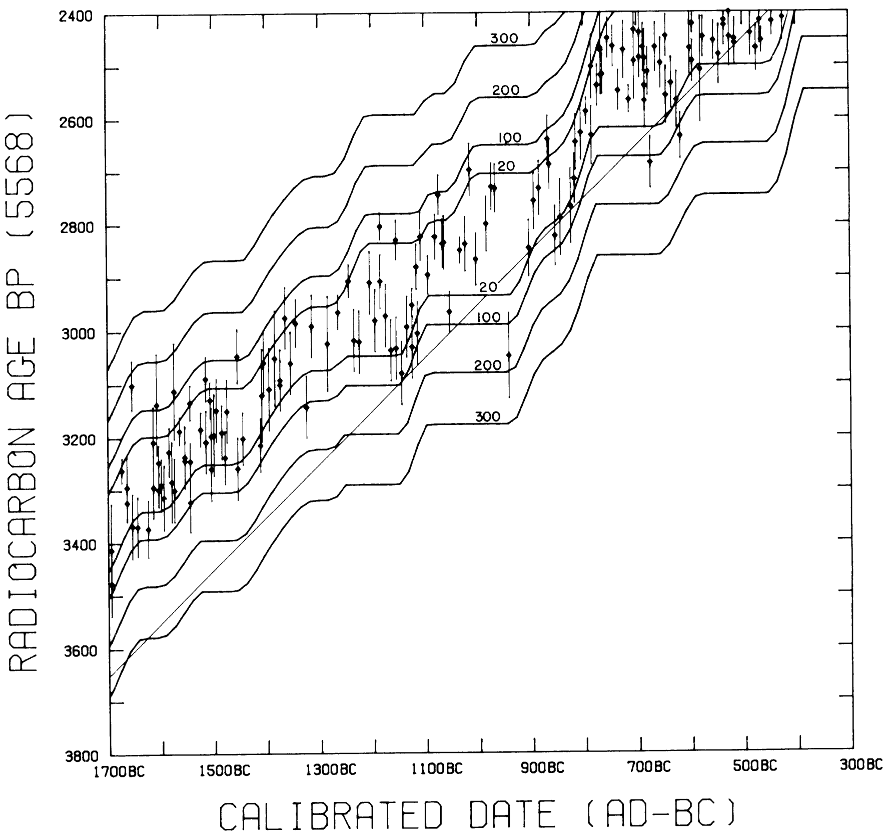

Fig 3C.

interpolate between tabulated ages, as rounding dates to the nearest five years does not significantly affect the calendric interval obtained. Negative values in the body of the table represent BC dates; positive, AD dates; and −1/1 represents the transition year between 1 BC and AD 1 (omitted in the widely-adopted chronology of Dionysius Exiguus (ca 525)).

Occasionally, there are large "jumps" in the length of the calibration intervals as read from the table, eg, between 1920 and 1930 BP ± 20 or between 1770 and 1780 BP ± 150 years. These are caused by "flat" regions in the calibration, *ie,* periods when the ^{14}C in the atmosphere has decreased at a rate greater than 1.2 per mil per 10 years, allowing multiple calendric ages for a single ^{14}C activity. In other calibrations, these periods have often been handled by assigning several calendric dates to a single radiocarbon age. However, as described previously, the ability to distinguish these as separate periods vanishes when the uncertainties of the calibration and radiocarbon activity measurement are considered. Reference to the calibration graphs should clarify this.

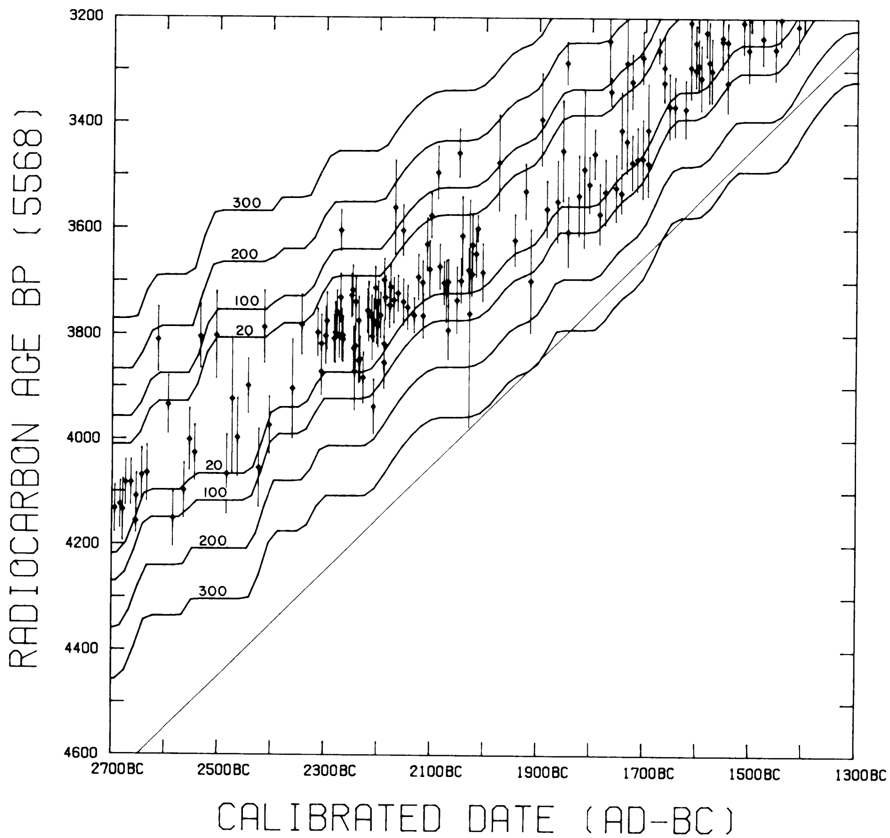

Fig 3D.

CALIBRATION INTERVAL FOR SAMPLES WITH UNCERTAINTIES GREATER THAN 300 YEARS

The following procedure should be employed in calibrating ages of samples with radiocarbon uncertainties greater than 300 years. First, 60 years should be subtracted from the uncertainty of the date to be calibrated. This is to remove the uncertainty of the calibration, which is automatically added into the range in the tables. Then, the resultant uncertainty should be added to and subtracted from the radiocarbon age of the sample, producing two ages which are looked up in the calibration table, under the columns headed by sigma=20 years. The calibration interval is formed from the extremes of the intervals obtained from the table. That is, the lower limit of the interval [older limit] is equal to the lower limit of the calibration interval for the radiocarbon age plus the modified uncertainty. Similarly, the upper limit [younger limit] is the upper limit of the calibration range for the radiocarbon age minus the modified uncertainty. As an example, consider the calibration of 3200 ± 400 years. First, subtract 60 years from 400 to obtain 340 years, which,

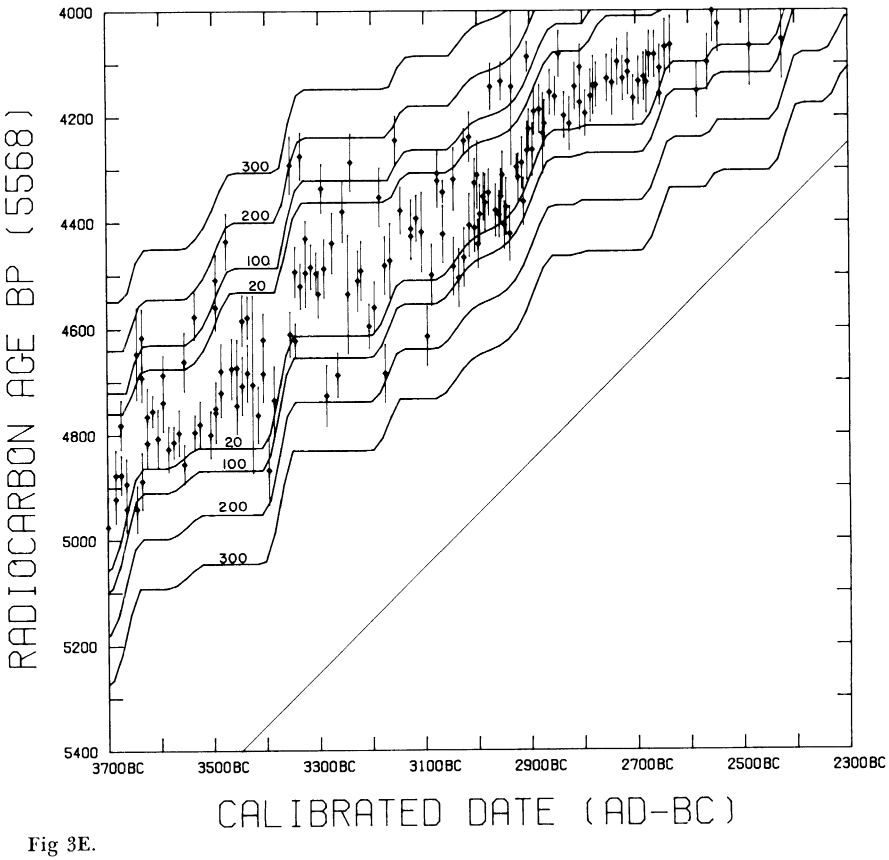

Fig 3E.

alternately added to and subtracted from the sample's radiocarbon age produces 3540 and 2860, respectively. Looking up the appropriate limits for these two ages, the interval 2110 to 875 BC is obtained.

CALIBRATION OF DATES BEYOND TABULATED VALUES

At this time, the only data set of sufficient quality to provide retrospective assessment of atmospheric ^{14}C to a precision suitable for calibration consists of measurements on wood. This is largely because of the stringent requirements for a sample suitable for this purpose. The sample must 1) be independently datable, 2) contain carbon that is reliably associated with atmospheric ^{14}C at the date of the sample formation, and 3) contain sufficient quantities of carbon for an accurate activity measurement.

Beyond the existing range of dendrochronologically dated wood, we must rely either on samples of inferior quality (shorter or less certain chronology, or of smaller size, frequently containing too little carbon to

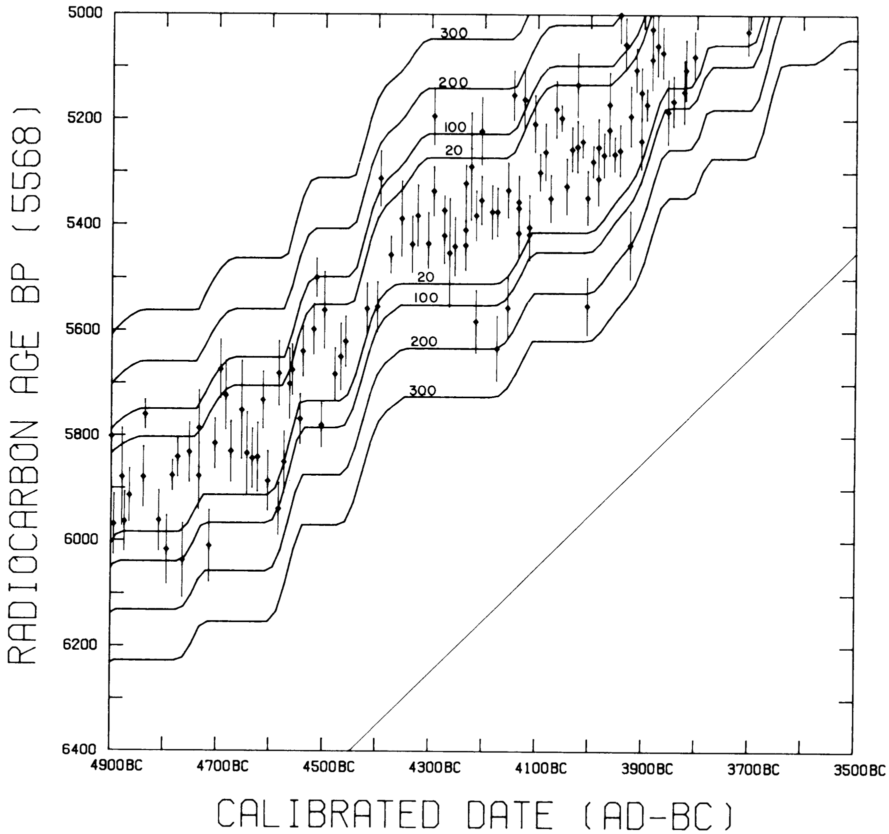

Fig 3F.

obtain an accurate date), or on "secondary" sources that estimate the constancy of cosmic rays from the measurements of other radionuclides, or from the inferred strength of the earth's magnetic field from archaeomagnetism. The consensus of these sources suggests that the cosmic ray flux reaching the earth and producing ^{14}C has probably remained constant to within ±10% over the past 50,000 years or more (Vogel, 1980; Barbetti, 1980; Forman and Shaeffer, 1980; Stuiver, 1971). A 10% uncertainty in a radiocarbon concentration represents an 800-year uncertainty in age, regardless of the age of the sample. Consequently, the current "best estimate" of the date of a sample older than 8000 years BP is obtained by assuming a constant atmospheric concentration of the ^{14}C, and using the 5730 half-life to calculate the date. An uncertainty of 1000 years, or the measurement uncertainty quoted by the laboratory, whichever is larger, would constitute a reasonable estimate of the uncertainty for the calendric age of the sample.

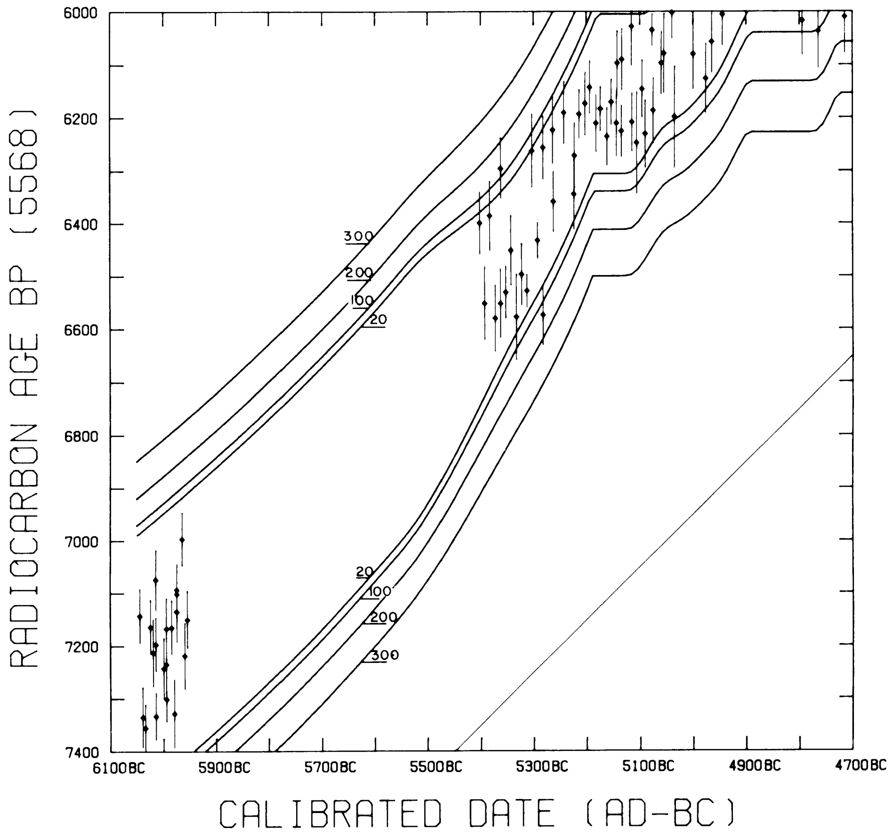

Fig 3G.

CONCLUDING REMARKS

It is the intent of the participants of the Workshop that this should be the first in a series of "consensus" calibrations, updated as warranted by improvements in the data base. At present, 1132 measurements of ^{14}C activity have been made on samples of bristlecone pine, the maximum age of which is 8000 years BP. There are 60 samples of wood currently being dated by the radiocarbon laboratories at the Universities of Arizona, California at La Jolla, Pennsylvania, and Washington which will extend the calibration another 550 years. An additional piece of wood, containing 500 rings, is still undatable dendrochronologically but from preliminary radiocarbon measurements appears to be approximately 9000 to 10,000 years old (Ferguson and Graybill, 1981). Another piece of wood, containing only 200 rings, also antedates the present master chronology.

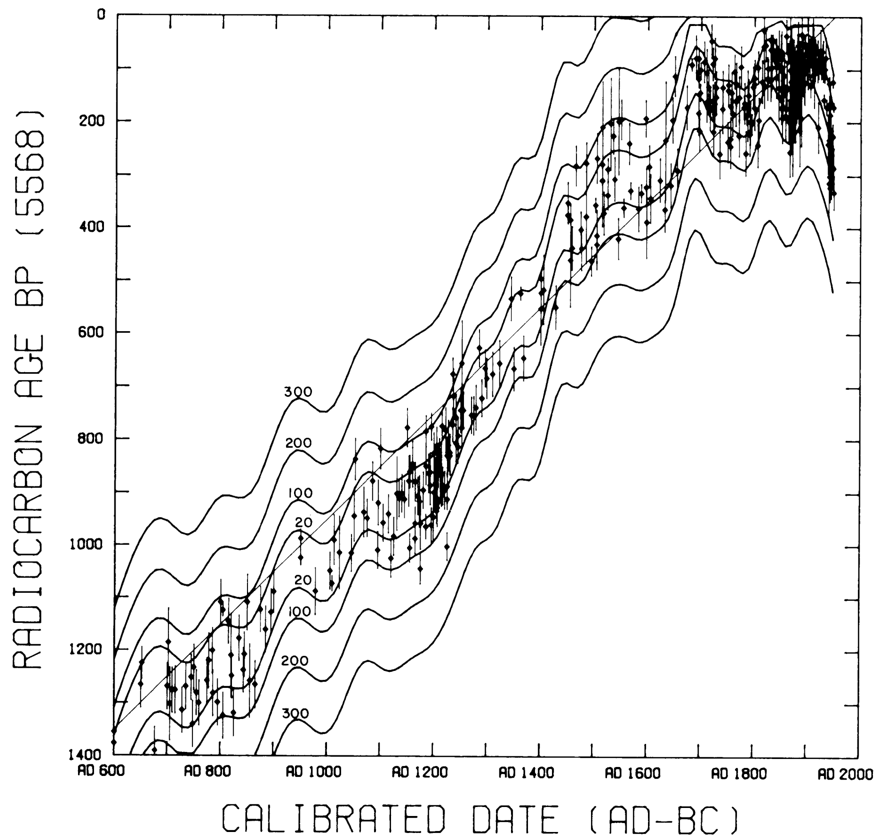

Fig 4. The first 1400 radiocarbon years. Similar to the graph in Figure 3A, here, however, the calibration function is not monotonic, and corresponds to the supplementary tables for the most recent 1000 years. Note that for several ages, multiple calendric intervals are possible for a single radiocarbon age.

Perhaps within the next few years, these pieces will be linked with the present 8681-year chronology extending it to beyond 11,000 years ago.

Still other chronologies are being developed both in this country and in Europe. The University of Washington has made activity measurements on nearly 2000 years of Douglas fir (Stuiver and Quay, 1980a; Stuiver and Quay, 1981). A second bristlecone chronology, 3200 years long, has been established on wood found in Nevada (Graybill, pers commun, 1982). Several floating chronologies are being developed in Europe (Becker, 1979; 1980; Beer *et al,* 1979; Lambert and Orcel, 1979; Pilcher *et al,* 1977) and it is likely that within the next few years it will be possible to connect them with existing recent chronologies. When this is done, they will be valuable in checking and reinforcing the USA chronologies. Even now, they are of some value after their age has been fixed using "wiggle matching" (see eg, Clark and Sowray, 1973) because these data sets are of high quality and their combined use (although not done in this work) with the calibration data set strengthens and reduces the errors of the current calibration.

ACKNOWLEDGMENTS

Special thanks are due J W Tukey and R M Clark for their many suggestions that have resulted in significant improvements in the algorithms originally presented to the Workshop. Thanks are due as well to C W Ferguson and the directors and staffs of the radiocarbon laboratories responsible for the activity measurements on these known-age samples, without which this work would not have been possible. We would also like to acknowledge the assistance of the operations staff at the University of Arizona's Computer Center, especially Jackie Dombrowski and Barry Shaede for their unfailing help, particularly during the preparations of the graphs presented here. The patience of those who have waited for the final publication of this calibration, even delaying their own work in some cases, also should not be forgotten. And finally, we would like to thank the National Science Foundation for their support of this publication through their Grant BNS-8022250, and for their support, since 1956, of the bristlecone-pine project, under the direction of C W Ferguson, through various grants, most recently EAR 78-04436 and EAR-8018687 and for their support of the USA laboratories involved in calibration-related research. The US Department of Energy should also be acknowledged for their recent support of the bristlecone-pine project with Contracts EE-78-A-28-3274 and DE-AC02-81EV10680.

REFERENCES

Barbetti, Mike, 1980, Geomagnetic strength over the last 50,000 years and changes in atmospheric ^{14}C concentration: emerging trends, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 2, p 192-199.

Becker, Bernd, 1979, Holocene tree ring series from southern central Europe for archaeological dating, radiocarbon calibration, and stable isotope analysis, *in* Berger, Rainer and Suess, H E, eds, Radiocarbon dating, Internatl radiocarbon conf, 9th, Proc: Berkeley/Los Angeles, Univ California Press, p 554-565.

———— 1980, Tree-ring dating and radiocarbon calibration in south-central Europe, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 2, p 219-226.

Beer, J, Giertz, V, Möll, M, Oeschger, Hans, Riesen, T, and Strahm, C, 1979, The contribution of the Swiss lake-dwellings to the calibration of radiocarbon dates, *in* Berger, Rainer and Suess, H E, eds, Radiocarbon dating, Internatl radiocarbon conf, 9th, Proc: Berkeley/Los Angeles, Univ California Press, p 566-584.

Bucha, V, 1970, Influence of the earth's magnetic field on radiocarbon dating, *in* Olsson, I U, ed, Radiocarbon variations and absolute chronology, Nobel symposium, 12th, Proc: New York, John Wiley & Sons, p 501-511.

Burchuladze, A A, Pagava, S V, Povinec, P, Togonidze, G I, and Usačev, S, 1980, Radiocarbon variations with the 11-year solar cycle during the last century: Nature, v 287, p 320-322.

Clark, R M, 1975, A calibration curve for radiocarbon dates: Antiquity, v 49, p 251-266.

——— 1979, Calibration, cross-validation and carbon-14, I: Royal Statistical Soc Jour, ser A, v 142, no. 1, p 47-62.

——— 1980, Calibration, cross-validation and carbon-14, II: Royal Statistical Soc Jour, ser A, v 143, no. 2, p 177-194.

Clark, R M and Renfrew, Colin, 1972, A statistical approach to the calibration of floating tree-ring chronologies using radiocarbon dates: Archaeometry, v 14, p 5-19.

Clark, R M and Sowray, A. 1973, Further statistical methods for the calibration of floating tree-ring chronologies: Archaeometry, v 15, no. 2, p 255-266.

Currie, L A, 1972, The evaluation of radiocarbon measurements and inherent statistical limitations in age resolution, *in* Rafter, T A and Grant-Taylor, T, eds, Internatl radiocarbon dating conf, 8th, Proc: Wellington, Royal Soc New Zealand, p 598-611.

Currie, L A and Polach, H A, 1980, Exploratory analysis of the international radiocarbon cross-calibration data: consensus values and interlaboratory error, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 3, p 933-935.

Damon, P E, 1970, Climatic versus magnetic perturbation of the atmospheric C-14 reservoir, *in* Olsson, I U, ed, Radiocarbon variations and absolute chronology, Nobel symposium, 12th, Proc: New York, John Wiley & Sons, p 571-593.

——— 1977, Solar induced variations of energetic particles at one AU, *in* White, O R, ed, The solar output and its variation: Boulder, Colorado, Colorado Assoc Univ Press, p 429-448.

Damon, P E, Ferguson, C W, Long, Austin, and Wallick, E I, 1974, Dendrochronologic calibration of the radiocarbon time scale: Am Antiquity, v 39, p 350-366.

Damon, P E, Lerman, J C, and Long, Austin, 1978, Temporal fluctuations of atmospheric ^{14}C: causal factors and implications: Ann Rev Earth Planetary Sci, p 457-494.

Damon, P E, Lerman, J C, Long, Austin, Bannister, B. Klein, Jeffrey, and Linick, T W, 1980, Report on the workshop on the calibration of the radiocarbon dating time scale, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 3, p 947-949.

Damon, P E, Long, Austin, and Grey, D C, 1966, Fluctuation of atmospheric C^{14} during the last six millennia: Jour Geophys Research, v 71, no. 4, p 1055-1063.

Damon, P E, Long, Austin, and Wallick, E I, 1972, Dendrochronologic calibration of the carbon-14 time scale, *in* Rafter, T A and Grant-Taylor, T, eds, Internatl radiocarbon dating conf, 8th, Proc: Wellington, Royal Soc New Zealand, p 44-59.

Dionysius Exiguus, ca AD 525, see Bickerman, E J, 1968, Chronology of the ancient world: Ithaca, New York, Cornell Univ Press.

Dixon, W J, 1960, Simplified estimation from censored normal samples: Ann Math Statistics, v 31, p 385-391.

Ferguson, C W, 1969, A 7104-year annual tree-ring chronology for bristlecone pine, *Pinus aristata,* from the White Mountains, California: Tree Ring Bull, v 29, no. 3-4, p 1-29.

——— 1970, Dendrochronology of bristlecone pine, *Pinus aristata:* establishment of a 7484-year chronology in the White Mountains of eastern-central California, *in* Olsson, I U, ed, Radiocarbon variations and absolute chronology, Nobel symposium, 12th, Proc: New York, John Wiley & Sons, p 237-245.

——— 1972, Dendrochronology of bristlecone pine prior to 4000 BC, *in* Rafter, T A and Grant-Taylor, T, eds, Internatl radiocarbon dating conf, 8th, Proc: Wellington, Royal Soc New Zealand, p A1-A10.

Ferguson, C W and Graybill, D A, 1981, Dendrochronology of bristlecone pine: Terminal rept NSF Grant EAR-78-04436 & DOE no. EE-78-A-28-3274.

Forman, M A and Schaeffer, O A, 1980, Cosmic ray intensity over long time scales: Preprint.

Grey, D C and Damon, P E, 1970, Sunspots and radiocarbon dating in the Middle Ages, *in* Berger, Rainer, ed, Scientific methods in medieval archaeology: Berkeley, Univ California Press, p 167-182.

Houtermanns, J C, 1966, On the quantitative relationship between geophysical parameters and the natural radiocarbon inventory: Zeitschr Physik, v 193, p 1-12.

———— 1971, Geophysical interpretations of the bristlecone radiocarbon measurements using the method of Fourier analysis of unequally spaced data: Doctoral dissert, Univ Bern.

Jong, A F M de and Mook, W G, 1980, Medium-term atmospheric ^{14}C variations, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 2, p 267-272.

Jong, A F M de, Mook, W G, and Becker, Bernd, 1979, Confirmation of the Suess wiggles: 3200-3700 BC: Nature, v 280, p 48-49.

Klein, Jeffrey, Lerman, J C, Damon, P E, and Linick, T W, 1980, Radiocarbon concentration in the atmosphere: 8000-year record of variations in tree rings: first results of a USA workshop, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 3, p 950-961.

Lal, Devendra and Venkatavaradan, V S, 1970, Analysis of the causes of C-14 variations in the atmosphere, *in* Olsson, I U, ed, Radiocarbon variations and absolute chronology, Nobel symposium, 12th, Proc: New York, John Wiley & Sons, p 549-569.

Lambert, G and Orcel, C, 1979, Dendrochronology of Neolithic settlements in western Switzerland: new possibility for prehistoric calibration, *in* Berger, Rainer and Suess, H E, eds, Radiocarbon dating, Internatl radiocarbon conf, 9th, Proc: Berkeley/Los Angeles, Univ California Press, p 585-590.

Lazear, G, Damon, P E, and Sternberg, R S, 1980, The concept of dc gain in modeling secular variations in atmospheric ^{14}C, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 2, p 318-327.

Lerman, J C, 1970a, General discussion of magnitudes of $^{14}C/^{12}C$ variations (discussion), *in* Olsson, I U, ed, Radiocarbon variations and absolute chronology, Nobel symposium, 12th, Proc: New York, John Wiley & Sons, p 121-126.

———— 1970b, General discussion of the causes of $^{14}C/^{12}C$ variations (discussion), *in* Olsson, I U, ed, Radiocarbon variations and absolute chronology, Nobel symposium, 12th, Proc: New York, John Wiley & Sons, p 327-333.

Lerman, J C, Mook, W G, and Vogel, J C, 1967, Effect of the Tunguska meteor and sunspots on radiocarbon in tree rings: Nature, v 216, p 990-991.

———— 1970, C-14 in tree rings from different localities, *in* Olsson, I U, ed, Radiocarbon variations and absolute chronology, Nobel symposium, 12th, Proc: New York, John Wiley & Sons, p 275-301.

Lerman, J C, Mook, W G, Vogel, J C, and Waard, H de, 1969, Carbon-14 in Patagonian tree rings: Science, v 165, p 1123-1125.

Lingenfelter, R E and Ramaty, R, 1970, Astrophysical and geophysical variations in ^{14}C production, *in* Olsson, I U, ed, Radiocarbon variations and absolute chronology, Nobel symposium, 12th, Proc: New York, John Wiley & Sons, p 513-537.

McKerrell, H, 1975, Correction procedures for C-14 dates, *in* Watkins, T, ed, Radiocarbon: calibration and prehistory: Edinburgh, Edinburgh Univ Press, p 47-100.

Michael, H N and Klein, Jeffrey, 1979, An international calibration for radiocarbon dates: MASCA Jour, v 1, no. 2, p 56-57.

Michael, H N and Ralph, E K, 1972, Discussion of radiocarbon dates obtained from precisely dated sequoia and bristlecone pine samples, *in* Rafter, T A and Grant-Taylor, T, eds, Internatl radiocarbon dating conf, 8th, Proc: Wellington, Royal Soc New Zealand, p 28-43.

Neftel, Albrecht, Oeschger, Hans, and Suess, H E, 1981, Secular non-random variations of cosmogenic carbon-14 in the terrestrial atmosphere: Earth and Planetary Sci Letters, v 56, p 127-147.

Oeschger, Hans, Siegenthaler, Ulrich, Schotterer, Ulrich and Gugelmann, A, 1975, A box diffusion model to study the carbon dioxide exchange in nature: Tellus, v 27, p 168-192.

Otlet, R L, Walker, A J, Hewson, A D, and Burleigh, Richard, 1980, ^{14}C interlaboratory comparisons in the UK: experiment design, preparation and preliminary results, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 3, p 936-946.

Pearson, G W, Pilcher, J R, Baillie, M G L, and Hillam, J, 1977, Absolute radiocarbon dating using a low altitude European tree-ring calibration: Nature, v 270, p 25-28.

Pilcher, J R, Hillam, J, Baillie, M G L, and Pearson, G W, 1977, A long subfossil oak tree-ring chronology from the north of Ireland: New Phytol, v 79, p 713-729.

Ralph, E K and Klein, Jeffrey, 1979, Composite computer plots of ^{14}C dates for tree-ring dated bristlecone pines and sequoias, *in* Berger, Rainer and Suess, H E, eds, Radiocarbon dating, Internatl radiocarbon conf, 9th, Proc: Berkeley/Los Angeles, Univ California Press, 545-553.

Ralph, E K and Michael, H N, 1970, MASCA radiocarbon dates for sequoia and bristlecone pine samples, *in* Olsson, I U, ed, Radiocarbon variations and absolute chronology, Nobel symposium, 12th, Proc: New York, John Wiley & Sons, p 619-624.

Ralph, E K, Michael, H N, and Han, M C, 1973, Radiocarbon dates and reality: MASCA Newsletter, v 9, p 1-20.

Renfrew, Colin and Clark, R M, 1974, Problems of the radiocarbon calendar and its calibration: Archaeometry, v 16, p 5-18.

Schulman, E, 1956, Dendroclimatic changes in semiarid America: Tucson, Univ Arizona Press.

Siegenthaler, Ulrich, Heimann, Martin, and Oeschger, Hans, 1980, ^{14}C variations caused by changes in the global carbon cycle, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 2, p 177-191.

Sternberg, R S and Damon, P E, 1979, Sensitivity of radiocarbon fluctuations and inventory to geomagnetic and reservoir parameters, *in* Berger, Rainer and Suess, H E, eds, Radiocarbon dating, Internatl radiocarbon conf, 9th, Proc: Berkeley/Los Angeles, Univ California Press, p 691-717.

Stuiver, Minze, 1971, Evidence for the variation of atmospheric ^{14}C content in the Late Quaternary, *in* Turekian, K K, ed, The late Cenozoic glacial ages: New Haven, Yale Univ Press, p 57-70.

Stuiver, Minze and Quay, P D, 1980a, Changes in atmospheric ^{14}C attributed to a variable sun: Science, v 207, p 11-19.

———— 1980b, Patterns of atmospheric ^{14}C changes, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 2, p 166-176.

———— 1981, Atmospheric ^{14}C changes resulting from fossil fuel CO_2 release and cosmic ray flux variability: Earth Planetary Sci Letters, v 53, p 349-362.

Stuiver, Minze and Suess, H E, 1966, On the relationship between radiocarbon dates and true ages: Radiocarbon, v 8, p 534-540.

Suess, H E, 1967, Bristlecone pine calibration of the radiocarbon time scale from 4100 BC to 1500 BC, *in* Radioactive dating and methods of low-level counting: Vienna, IAEA, p 143-151.

———— 1970a, Bristlecone pine calibration of the radiocarbon time-scale 5200 BC to the present, *in* Olsson, I U, ed, Radiocarbon variations and absolute chronology, Nobel symposium, 12th, Proc: New York, John Wiley & Sons, p 303-311.

———— 1970b, The three causes of the secular C-14 fluctuations, their amplitudes and time constants, *in* Olsson, I U, ed, Radiocarbon variations and absolute chronology, Nobel symposium, 12th, Proc: New York, John Wiley & Sons, p 595-604.

———— 1979, A calibration table for conventional radiocarbon dates, *in* Berger, Rainer and Suess, H E, eds, Radiocarbon dating, Internatl radiocarbon conf, 9th, Proc: Berkeley/Los Angeles, Univ California Press, p 777-785.

———— 1980, The radiocarbon record in tree rings of the last 8000 years, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 2, p 200-209.

Switsur, V R, 1973, The radiocarbon calendar recalibrated: Antiquity, v 47, p 131-137.

Vries, Hessel de, 1958, Variation in the concentration of radiocarbon with time and location on earth: Koninkl Nederlandse Akad Wetensch Proc, ser B, v 61, p 94-102.

———— 1959, Measurement and use of natural radiocarbon, *in* Abelson, P H, ed, Researches in geochemistry: New York, John Wiley & Sons, p 169-189.

Vogel, J C, 1980, Accuracy of the radiocarbon time scale beyond 15,000 BP, *in* Stuiver, Minze and Kra, Renee, eds, Internatl radiocarbon conf, 10th, Proc: Radiocarbon, v 22, no. 2, p 210-218.

Wendland, W M and Donley, D L, 1971, Radiocarbon-calendar age relationship: Earth Planetary Sci Letters, v 2, p 135-139.

Willis, E H, Tauber, Henrik and Münnich, K O, 1960, Variations in the atmospheric radiocarbon concentration over the past 1300 years: Radiocarbon, v 2, p 1-4.

TABLE 1
SYSTEMATIC DIFFERENCES OBSERVED BETWEEN LABORATORIES

Laboratory	Average deviation from mean (Δ‰)
Arizona (A)	+3.0 ± 1.7
Groningen (GrN)	+2.7 ± 1.5
La Jolla (Lj)	—3.2 ± 1.1
Pennsylvania (P)	+3.4 ± 2.5
Yale (Y)	+3.2 ± 2.0

TABLE 2
MAIN CALIBRATION TABLES (P 124)
(See instructions in text and in footnote below)

Look up under nearest tabulated value radiocarbon dates with uncertainties between tabulated values, hence:

for sigma =	look up under:
0 — 35	$\sigma = 20$
36 — 75	$\sigma = 50$
76 — 125	$\sigma = 100$
126 — 175	$\sigma = 150$
176 — 250	$\sigma = 200$
251 — 350	$\sigma = 300$
> 350	use the procedure described in the text

* in body of table indicates multiple calibrated ranges exist for these dates. See supplementary tables.

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF											
	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
7240	-6545	-5625	-6555	-5615	-6585	-5595	-6630	-5565	-6685	-5530	-6825	-5455
7230	-6535	-5615	-6545	-5610	-6570	-5590	-6615	-5555	-6675	-5520	-6815	-5450
7220	-6520	-5605	-6530	-5600	-6560	-5580	-6605	-5550	-6660	-5515	-6800	-5445
7210	-6510	-5595	-6520	-5590	-6545	-5570	-6590	-5540	-6650	-5510	-6790	-5440
7200	-6495	-5590	-6505	-5585	-6535	-5565	-6580	-5535	-6635	-5500	-6775	-5435
7190	-6485	-5580	-6495	-5575	-6520	-5555	-6565	-5525	-6625	-5495	-6765	-5430
7180	-6470	-5570	-6480	-5565	-6510	-5545	-6555	-5520	-6610	-5490	-6750	-5425
7170	-6460	-5565	-6470	-5555	-6495	-5535	-6540	-5510	-6600	-5485	-6740	-5420
7160	-6445	-5555	-6455	-5550	-6485	-5530	-6530	-5505	-6585	-5480	-6725	-5415
7150	-6435	-5545	-6445	-5540	-6470	-5525	-6515	-5500	-6575	-5475	-6715	-5410
7140	-6420	-5540	-6430	-5530	-6460	-5515	-6505	-5495	-6560	-5470	-6700	-5405
7130	-6410	-5530	-6420	-5525	-6445	-5510	-6490	-5490	-6550	-5465	-6690	-5400
7120	-6395	-5525	-6405	-5520	-6435	-5505	-6480	-5485	-6535	-5455	-6675	-5395
7110	-6385	-5515	-6395	-5510	-6420	-5500	-6465	-5480	-6525	-5450	-6665	-5390
7100	-6370	-5510	-6380	-5505	-6410	-5490	-6455	-5470	-6510	-5445	-6650	-5385
7090	-6360	-5505	-6370	-5500	-6395	-5485	-6440	-5465	-6500	-5440	-6640	-5380
7080	-6345	-5500	-6355	-5495	-6385	-5480	-6430	-5460	-6485	-5435	-6625	-5375
7070	-6335	-5495	-6345	-5490	-6370	-5475	-6415	-5455	-6475	-5435	-6615	-5370
7060	-6320	-5490	-6330	-5485	-6360	-5470	-6405	-5450	-6460	-5430	-6600	-5365
7050	-6310	-5485	-6320	-5480	-6345	-5465	-6390	-5450	-6450	-5425	-6590	-5360
7040	-6295	-5480	-6305	-5475	-6335	-5460	-6380	-5445	-6435	-5420	-6575	-5350
7030	-6285	-5475	-6295	-5470	-6320	-5455	-6365	-5440	-6425	-5415	-6565	-5345
7020	-6270	-5470	-6280	-5465	-6310	-5450	-6355	-5435	-6410	-5410	-6550	-5340
7010	-6260	-5465	-6270	-5460	-6295	-5450	-6340	-5430	-6400	-5405	-6540	-5335
7000	-6245	-5460	-6255	-5455	-6285	-5445	-6330	-5425	-6385	-5400	-6525	-5330
6990	-6235	-5455	-6245	-5450	-6270	-5440	-6315	-5420	-6375	-5395	-6515	-5325
6980	-6220	-5450	-6230	-5445	-6260	-5435	-6305	-5415	-6360	-5390	-6500	-5320
6970	-6210	-5445	-6220	-5440	-6245	-5430	-6290	-5410	-6350	-5385	-6490	-5315
6960	-6195	-5440	-6205	-5435	-6235	-5425	-6280	-5405	-6335	-5380	-6475	-5310
6950	-6185	-5435	-6195	-5435	-6220	-5420	-6265	-5400	-6325	-5375	-6465	-5305
6940	-6170	-5430	-6180	-5430	-6210	-5415	-6255	-5395	-6310	-5370	-6450	-5295
6930	-6160	-5430	-6170	-5425	-6195	-5410	-6240	-5390	-6300	-5365	-6440	-5290
6920	-6145	-5425	-6155	-5420	-6185	-5410	-6230	-5385	-6285	-5360	-6425	-5285
6910	-6135	-5420	-6145	-5415	-6170	-5405	-6215	-5385	-6275	-5355	-6415	-5280
6900	-6120	-5415	-6130	-5410	-6160	-5400	-6205	-5380	-6260	-5350	-6400	-5275

CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF

RADIOCARBON AGE (BP) 5568 HALF-LIFE	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
6890	-6110	-5410	-6120	-5405	-6145	-5395	-6190	-5375	-6250	-5345	-6390	-5270
6880	-6095	-5405	-6105	-5405	-6135	-5390	-6180	-5370	-6235	-5340	-6375	-5265
6870	-6085	-5405	-6095	-5400	-6120	-5385	-6165	-5365	-6225	-5335	-6365	-5260
6860	-6070	-5400	-6080	-5395	-6110	-5380	-6155	-5360	-6210	-5330	-6350	-5255
6850	-6060	-5395	-6070	-5390	-6095	-5375	-6140	-5355	-6200	-5325	-6340	-5250
6840	-6045	-5390	-6055	-5385	-6085	-5370	-6130	-5350	-6185	-5320	-6325	-5245
6830	-6035	-5385	-6045	-5380	-6070	-5365	-6115	-5345	-6175	-5310	-6315	-5240
6820	-6025	-5380	-6030	-5375	-6060	-5365	-6105	-5340	-6160	-5305	-6300	-5235
6810	-6010	-5375	-6020	-5375	-6045	-5360	-6090	-5335	-6150	-5300	-6290	-5230
6800	-6000	-5375	-6005	-5370	-6035	-5355	-6080	-5330	-6135	-5295	-6275	-5225
6790	-5985	-5370	-5995	-5365	-6020	-5350	-6065	-5325	-6125	-5290	-6265	-5220
6780	-5975	-5365	-5985	-5360	-6010	-5345	-6055	-5320	-6110	-5285	-6250	-5215
6770	-5965	-5360	-5970	-5355	-6000	-5340	-6040	-5315	-6100	-5280	-6240	-5210
6760	-5950	-5355	-5960	-5350	-5985	-5335	-6030	-5305	-6085	-5275	-6225	-5210
6750	-5940	-5350	-5950	-5345	-5975	-5330	-6015	-5300	-6075	-5270	-6215	-5205
6740	-5930	-5345	-5935	-5340	-5965	-5325	-6005	-5295	-6060	-5265	-6200	-5200
6730	-5915	-5340	-5925	-5335	-5950	-5320	-5995	-5290	-6050	-5260	-6190	-5195
6720	-5905	-5335	-5915	-5330	-5940	-5315	-5980	-5285	-6035	-5255	-6175	-5190
6710	-5895	-5330	-5900	-5325	-5930	-5310	-5970	-5280	-6025	-5250	-6165	-5190
6700	-5885	-5325	-5890	-5320	-5915	-5305	-5960	-5275	-6010	-5245	-6150	-5185
6690	-5875	-5320	-5880	-5315	-5905	-5295	-5945	-5270	-6000	-5240	-6140	-5105
6680	-5860	-5315	-5870	-5310	-5895	-5290	-5935	-5265	-5990	-5235	-6125	-5095
6670	-5850	-5310	-5860	-5305	-5885	-5285	-5925	-5260	-5975	-5230	-6115	-5090
6660	-5840	-5305	-5845	-5300	-5870	-5280	-5910	-5255	-5965	-5225	-6100	-5080
6650	-5830	-5300	-5835	-5295	-5860	-5275	-5900	-5250	-5955	-5220	-6090	-5075
6640	-5820	-5295	-5825	-5290	-5850	-5270	-5890	-5245	-5940	-5215	-6075	-5070
6630	-5810	-5290	-5815	-5285	-5840	-5265	-5880	-5240	-5930	-5210	-6065	-5065
6620	-5795	-5285	-5805	-5280	-5830	-5260	-5865	-5235	-5920	-5210	-6050	-5055
6610	-5785	-5280	-5795	-5275	-5820	-5255	-5855	-5230	-5905	-5205	-6040	-5050
6600	-5775	-5275	-5785	-5270	-5805	-5250	-5845	-5225	-5895	-5200	-6025	-5035
6590	-5765	-5270	-5775	-5260	-5795	-5245	-5835	-5220	-5885	-5195	-6015	-5015
6580	-5755	-5265	-5760	-5255	-5785	-5240	-5825	-5215	-5875	-5190	-6005	-5005
6570	-5745	-5260	-5750	-5255	-5775	-5235	-5815	-5210	-5865	-5190	-5990	-4995
6560	-5735	-5255	-5740	-5250	-5765	-5230	-5805	-5210	-5850	-5185	-5980	-4985
6550	-5725	-5250	-5730	-5245	-5755	-5225	-5790	-5205	-5840	-5105	-5970	-4975

RADIOCARBON AGE (BP) 5568 HALF-LIFE	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF											
6540	-5715	-5245	-5720	-5240	-5745	-5220	-5780	-5200	-5830	-5095	-5955	-4965
6530	-5705	-5240	-5710	-5235	-5735	-5220	-5770	-5195	-5820	-5090	-5945	-4955
6520	-5695	-5235	-5700	-5230	-5725	-5215	-5760	-5190	-5810	-5085	-5935	-4950
6510	-5685	-5230	-5690	-5225	-5715	-5210	-5750	-5190	-5800	-5075	-5920	-4945
6500	-5675	-5225	-5680	-5220	-5705	-5205	-5740	-5185	-5790	-5070	-5910	-4935
6490	-5665	-5220	-5670	-5215	-5695	-5200	-5730	-5110	-5775	-5065	-5900	-4930
6480	-5655	-5215	-5660	-5210	-5685	-5195	-5720	-5100	-5765	-5060	-5890	-4925
6470	-5645	-5215	-5650	-5210	-5675	-5195	-5710	-5090	-5755	-5050	-5875	-4920
6460	-5635	-5210	-5640	-5205	-5665	-5190	-5700	-5085	-5745	-5035	-5865	-4915
6450	-5625	-5205	-5630	-5200	-5655	-5185	-5690	-5080	-5735	-5020	-5855	-4910
6440	-5615	-5200	-5620	-5195	-5645	-5180	-5680	-5075	-5725	-5005	-5845	-4905
6430	-5605	-5195	-5610	-5190	-5635	-5105	-5670	-5065	-5715	-4995	-5835	-4900
6420	-5595	-5195	-5605	-5190	-5625	-5095	-5660	-5060	-5705	-4985	-5820	-4895
6410	-5590	-5190	-5595	-5185	-5615	-5090	-5650	-5055	-5695	-4980	-5810	-4765
6400	-5580	-5185	-5585	-5115	-5605	-5080	-5640	-5040	-5685	-4970	-5800	-4755
6390	-5570	-5180	-5575	-5105	-5595	-5075	-5630	-5025	-5675	-4960	-5790	-4745
6380	-5560	-5105	-5565	-5095	-5590	-5070	-5620	-5010	-5665	-4955	-5780	-4740
6370	-5555	-5095	-5560	-5090	-5580	-5065	-5610	-5000	-5655	-4945	-5770	-4735
6360	-5545	-5090	-5550	-5080	-5570	-5055	-5600	-4990	-5645	-4940	-5760	-4735
6350	-5535	-5085	-5540	-5075	-5560	-5050	-5595	-4985	-5635	-4935	-5750	-4730
6340	-5525	-5080	-5530	-5070	-5555	-5035	-5585	-4975	-5625	-4930	-5740	-4725
6330	-5515	-5070	-5520	-5065	-5545	-5020	-5575	-4965	-5615	-4925	-5730	-4590
6320	-5500	-5065	-5510	-5055	-5535	-5005	-5565	-4960	-5610	-4920	-5720	-4585
6310	-5485	-5060	-5500	-5050	-5525	-5000	-5560	-4950	-5600	-4915	-5710	-4580
6300	-5470	-5050	-5485	-5035	-5515	-4990	-5550	-4945	-5590	-4910	-5700	-4575
6290	-5445	-5040	-5465	-5020	-5505	-4980	-5540	-4940	-5580	-4905	-5690	-4575
6280	-5420	-5025	-5440	-5010	-5490	-4975	-5530	-4935	-5570	-4900	-5680	-4570
6270	-5400	-5010	-5420	-5000	-5475	-4965	-5520	-4930	-5565	-4895	-5670	-4570
6260	-5380	-5000	-5395	-4990	-5455	-4960	-5510	-4925	-5555	-4890	-5660	-4565
6250	-5365	-4995	-5380	-4985	-5435	-4950	-5500	-4920	-5545	-4755	-5650	-4565
6240	-5355	-4985	-5365	-4975	-5415	-4945	-5485	-4915	-5540	-4750	-5640	-4560
6230	-5345	-4980	-5355	-4970	-5395	-4940	-5470	-4910	-5530	-4745	-5630	-4560
6220	-5335	-4970	-5345	-4960	-5380	-4935	-5455	-4905	-5520	-4740	-5620	-4555
6210	-5325	-4965	-5335	-4955	-5370	-4930	-5440	-4900	-5510	-4735	-5610	-4555
6200	-5320	-4960	-5325	-4950	-5360	-4925	-5420	-4895	-5495	-4730	-5600	-4550

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF											
	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
6190	-5310	-4950	-5320	-4945	-5350	-4920	-5405	-4890	-5485	-4725	-5595	-4550
6180	-5305	-4945	-5310	-4940	-5340	-4920	-5390	-4765	-5470	-4590	-5585	-4545
6170	-5300	-4940	-5305	-4935	-5330	-4915	-5380	-4755	-5455	-4585	-5575	-4545
6160	-5295	-4935	-5300	-4930	-5325	-4910	-5365	-4745	-5440	-4580	-5565	-4540
6150	-5290	-4930	-5295	-4925	-5315	-4905	-5355	-4740	-5425	-4580	-5560	-4455
6140	-5280	-4930	-5290	-4920	-5310	-4900	-5345	-4735	-5410	-4575	-5550	-4450
6130	-5275	-4925	-5285	-4915	-5305	-4895	-5340	-4735	-5400	-4570	-5540	-4445
6120	-5270	-4920	-5275	-4915	-5295	-4890	-5330	-4730	-5385	-4570	-5530	-4440
6110	-5265	-4915	-5270	-4910	-5290	-4765	-5325	-4725	-5375	-4565	-5525	-4440
6100	-5260	-4910	-5265	-4905	-5285	-4755	-5315	-4590	-5365	-4565	-5515	-4435
6090	-5255	-4905	-5260	-4900	-5280	-4750	-5310	-4585	-5355	-4560	-5500	-4430
6080	-5250	-4905	-5255	-4895	-5275	-4740	-5305	-4580	-5345	-4560	-5490	-4430
6070	-5245	-4900	-5250	-4890	-5270	-4740	-5300	-4575	-5340	-4555	-5480	-4425
6060	-5240	-4895	-5245	-4885	-5265	-4735	-5290	-4575	-5330	-4555	-5470	-4425
6050	-5235	-4890	-5240	-4770	-5260	-4730	-5285	-4570	-5325	-4550	-5455	-4420
6040	-5230	-4885	-5235	-4755	-5255	-4725	-5280	-4565	-5315	-4550	-5445	-4420
6030	-5225	-4880	-5230	-4750	-5250	-4590	-5275	-4565	-5310	-4545	-5430	-4415
6020	-5220	-4755	-5225	-4745	-5245	-4585	-5270	-4565	-5305	-4545	-5420	-4415
6010	-5215	-4750	-5220	-4740	-5240	-4580	-5265	-4560	-5300	-4540	-5405	-4410
6000	-5210	-4745	-5215	-4735	-5235	-4575	-5260	-4560	-5295	-4460	-5395	-4410
5990	-5205	-4740	-5210	-4730	-5230	-4575	-5255	-4555	-5285	-4450	-5385	-4405
5980	-5200	-4735	-5205	-4600	-5225	-4570	-5250	-4555	-5280	-4445	-5375	-4400
5970	-5195	-4730	-5200	-4590	-5220	-4570	-5245	-4550	-5275	-4440	-5365	-4395
5960	-5190	-4725	-5195	-4585	-5215	-4565	-5240	-4550	-5270	-4440	-5360	-4390
5950	-5185	-4590	-5190	-4580	-5210	-4565	-5235	-4545	-5265	-4435	-5350	-4385
5940	-5185	-4585	-5190	-4575	-5205	-4560	-5230	-4545	-5260	-4435	-5345	-4375
5930	-5180	-4580	-5185	-4575	-5200	-4560	-5225	-4540	-5255	-4430	-5335	-4365
5920	-5175	-4575	-5180	-4570	-5195	-4555	-5220	-4455	-5250	-4425	-5330	-4355
5910	-5075	-4575	-5175	-4565	-5190	-4555	-5215	-4450	-5245	-4425	-5320	-4160
5900	-5065	-4570	-5075	-4565	-5185	-4550	-5210	-4445	-5240	-4420	-5315	-4150
5890	-5060	-4570	-5070	-4560	-5180	-4550	-5205	-4440	-5235	-4420	-5310	-4145
5880	-5050	-4565	-5060	-4560	-5180	-4545	-5200	-4435	-5230	-4415	-5305	-4140
5870	-5040	-4565	-5055	-4555	-5080	-4545	-5195	-4435	-5225	-4415	-5295	-4135
5860	-5015	-4560	-5045	-4555	-5075	-4540	-5190	-4430	-5220	-4410	-5290	-4130
5850	-4990	-4560	-5020	-4555	-5070	-4450	-5190	-4430	-5215	-4410	-5285	-4125

CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF

RADIOCARBON AGE (BP) 5568 HALF-LIFE	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
5840	-4965	-4555	-4995	-4550	-5060	-4445	-5185	-4425	-5210	-4405	-5280	-4120
5830	-4945	-4555	-4975	-4550	-5055	-4445	-5180	-4425	-5205	-4400	-5275	-4115
5820	-4935	-4550	-4950	-4545	-5040	-4440	-5175	-4420	-5200	-4400	-5270	-4110
5810	-4925	-4550	-4940	-4540	-5020	-4435	-5075	-4420	-5195	-4395	-5265	-3990
5800	-4915	-4545	-4930	-4460	-5000	-4435	-5070	-4415	-5195	-4385	-5260	-3980
5790	-4905	-4545	-4920	-4450	-4980	-4430	-5065	-4410	-5190	-4380	-5255	-3970
5780	-4895	-4460	-4910	-4445	-4960	-4430	-5055	-4410	-5185	-4365	-5250	-3965
5770	-4880	-4450	-4905	-4440	-4945	-4425	-5050	-4405	-5180	-4355	-5245	-3960
5760	-4855	-4445	-4895	-4440	-4935	-4420	-5035	-4405	-5175	-4160	-5240	-3950
5750	-4725	-4440	-4880	-4435	-4925	-4420	-5010	-4400	-5080	-4150	-5235	-3945
5740	-4720	-4440	-4855	-4430	-4920	-4415	-4990	-4395	-5075	-4140	-5230	-3935
5730	-4720	-4435	-4730	-4430	-4910	-4415	-4975	-4390	-5065	-4135	-5225	-3925
5720	-4715	-4430	-4725	-4425	-4905	-4410	-4960	-4380	-5060	-4130	-5220	-3920
5710	-4710	-4430	-4720	-4425	-4895	-4410	-4945	-4370	-5050	-4125	-5215	-3915
5700	-4700	-4425	-4715	-4420	-4885	-4405	-4935	-4355	-5040	-4120	-5210	-3910
5690	-4695	-4425	-4710	-4420	-4870	-4400	-4930	-4155	-5020	-4115	-5205	-3905
5680	-4690	-4420	-4705	-4415	-4850	-4400	-4920	-4145	-5000	-4110	-5200	-3900
5670	-4680	-4420	-4700	-4415	-4730	-4395	-4915	-4140	-4985	-4105	-5195	-3895
5660	-4565	-4415	-4690	-4410	-4725	-4385	-4905	-4135	-4970	-3985	-5190	-3895
5650	-4565	-4415	-4685	-4405	-4720	-4380	-4900	-4130	-4955	-3975	-5190	-3890
5640	-4560	-4410	-4670	-4405	-4715	-4365	-4890	-4125	-4945	-3970	-5185	-3890
5630	-4560	-4405	-4565	-4400	-4710	-4155	-4880	-4120	-4935	-3960	-5180	-3885
5620	-4555	-4405	-4560	-4395	-4705	-4150	-4865	-4115	-4930	-3955	-5175	-3880
5610	-4555	-4400	-4560	-4390	-4700	-4140	-4845	-4110	-4920	-3950	-5080	-3880
5600	-4550	-4395	-4555	-4380	-4690	-4135	-4730	-3995	-4915	-3940	-5075	-3875
5590	-4550	-4390	-4555	-4170	-4685	-4130	-4725	-3980	-4910	-3930	-5070	-3875
5580	-4545	-4380	-4550	-4155	-4670	-4125	-4720	-3975	-4900	-3925	-5060	-3870
5570	-4545	-4160	-4550	-4145	-4565	-4120	-4715	-3965	-4895	-3915	-5055	-3865
5560	-4540	-4150	-4550	-4140	-4560	-4115	-4710	-3960	-4885	-3910	-5045	-3865
5550	-4540	-4140	-4545	-4130	-4560	-4110	-4705	-3955	-4870	-3905	-5025	-3860
5540	-4535	-4135	-4540	-4125	-4555	-3990	-4700	-3945	-4855	-3900	-5005	-3855
5530	-4530	-4130	-4540	-4120	-4555	-3980	-4690	-3935	-4730	-3900	-4990	-3800
5520	-4525	-4125	-4535	-4115	-4550	-3970	-4685	-3930	-4725	-3895	-4975	-3795
5510	-4520	-4120	-4530	-4110	-4550	-3965	-4670	-3920	-4720	-3890	-4960	-3790
5500	-4440	-4115	-4530	-3995	-4545	-3960	-4565	-3915	-4715	-3890	-4950	-3785

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
5490	-4435	-4110	-4520	-3980	-4545	-3950	-4560	-3910	-4715	-3885	-4940	-3785
5480	-4435	-3985	-4440	-3975	-4540	-3945	-4560	-3905	-4705	-3885	-4935	-3780
5470	-4430	-3975	-4435	-3965	-4540	-3935	-4555	-3900	-4700	-3880	-4925	-3780
5460	-4430	-3970	-4435	-3960	-4535	-3930	-4555	-3900	-4695	-3880	-4920	-3690
5450	-4425	-3965	-4430	-3955	-4530	-3920	-4550	-3895	-4690	-3875	-4915	-3685
5440	-4425	-3955	-4430	-3945	-4525	-3915	-4550	-3890	-4680	-3870	-4910	-3680
5430	-4420	-3950	-4425	-3940	-4520	-3910	-4545	-3890	-4565	-3870	-4900	-3675
5420	-4420	-3940	-4425	-3930	-4440	-3905	-4545	-3885	-4565	-3865	-4895	-3675
5410	-4415	-3935	-4420	-3925	-4435	-3900	-4540	-3885	-4560	-3860	-4885	-3670
5400	-4415	-3925	-4420	-3915	-4435	-3895	-4540	-3880	-4560	-3860	-4875	-3670
5390	-4410	-3920	-4415	-3910	-4430	-3895	-4535	-3875	-4555	-3805	-4860	-3665
5380	-4410	-3915	-4415	-3905	-4430	-3890	-4530	-3875	-4555	-3795	-4840	-3665
5370	-4405	-3910	-4410	-3900	-4425	-3890	-4525	-3870	-4550	-3790	-4730	-3660
5360	-4405	-3905	-4410	-3900	-4425	-3885	-4520	-3870	-4550	-3790	-4725	-3660
5350	-4400	-3900	-4405	-3895	-4420	-3880	-4440	-3865	-4545	-3785	-4720	-3655
5340	-4395	-3895	-4405	-3890	-4420	-3880	-4435	-3860	-4545	-3780	-4715	-3655
5330	-4390	-3895	-4400	-3890	-4415	-3875	-4435	-3855	-4540	-3780	-4710	-3650
5320	-4385	-3890	-4395	-3885	-4415	-3875	-4430	-3800	-4535	-3775	-4705	-3650
5310	-4380	-3885	-4390	-3885	-4410	-3870	-4430	-3795	-4535	-3690	-4700	-3645
5300	-4370	-3885	-4385	-3880	-4405	-3870	-4425	-3790	-4530	-3685	-4690	-3645
5290	-4360	-3880	-4380	-3880	-4405	-3865	-4425	-3790	-4525	-3680	-4685	-3640
5280	-4350	-3880	-4370	-3875	-4400	-3860	-4420	-3785	-4440	-3675	-4670	-3635
5270	-4345	-3875	-4355	-3870	-4395	-3855	-4420	-3780	-4435	-3675	-4565	-3560
5260	-4335	-3875	-4350	-3870	-4395	-3800	-4415	-3780	-4435	-3670	-4560	-3550
5250	-4330	-3870	-4340	-3865	-4390	-3795	-4410	-3775	-4430	-3670	-4560	-3540
5240	-4325	-3865	-4335	-3860	-4380	-3790	-4410	-3690	-4430	-3665	-4555	-3530
5230	-4320	-3865	-4330	-3860	-4370	-3790	-4405	-3685	-4425	-3665	-4555	-3395
5220	-4305	-3860	-4325	-3805	-4360	-3785	-4405	-3680	-4425	-3660	-4550	-3390
5210	-4145	-3855	-4315	-3800	-4350	-3780	-4400	-3675	-4420	-3660	-4550	-3390
5200	-4140	-3800	-4300	-3795	-4345	-3780	-4395	-3675	-4420	-3655	-4545	-3385
5190	-4135	-3795	-4145	-3790	-4335	-3775	-4390	-3670	-4415	-3655	-4545	-3385
5180	-4130	-3790	-4140	-3785	-4330	-3690	-4385	-3670	-4415	-3650	-4540	-3380
5170	-4130	-3785	-4135	-3785	-4325	-3685	-4380	-3665	-4410	-3650	-4540	-3380
5160	-4125	-3785	-4130	-3780	-4315	-3680	-4365	-3665	-4410	-3645	-4535	-3375
5150	-4120	-3780	-4125	-3775	-4305	-3675	-4355	-3660	-4405	-3645	-4530	-3375

CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF

RADIOCARBON AGE (BP) 5568 HALF-LIFE	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
5140	-4115	-3780	-4120	-3775	-4140	-3675	-4350	-3660	-4400	-3640	-4525	-3375
5130	-4110	-3775	-4120	-3690	-4135	-3670	-4340	-3655	-4395	-3635	-4520	-3370
5120	-4110	-3695	-4115	-3685	-4130	-3670	-4335	-3655	-4395	-3565	-4440	-3370
5110	-4105	-3685	-4110	-3680	-4130	-3665	-4330	-3655	-4385	-3550	-4435	-3370
5100	-4100	-3680	-4105	-3675	-4125	-3665	-4320	-3650	-4380	-3540	-4430	-3365
5090	-4095	-3680	-4100	-3675	-4120	-3660	-4315	-3645	-4370	-3530	-4430	-3365
5080	-4090	-3675	-4095	-3670	-4115	-3660	-4140	-3645	-4360	-3395	-4425	-3360
5070	-4080	-3675	-4090	-3670	-4110	-3660	-4135	-3640	-4350	-3390	-4425	-3360
5060	-3955	-3670	-4085	-3665	-4105	-3655	-4130	-3640	-4340	-3390	-4420	-3360
5050	-3945	-3670	-4075	-3665	-4100	-3655	-4130	-3570	-4335	-3385	-4420	-3355
5040	-3935	-3665	-3950	-3660	-4100	-3650	-4125	-3555	-4330	-3385	-4415	-3355
5030	-3930	-3665	-3940	-3660	-4090	-3650	-4120	-3545	-4325	-3380	-4415	-3350
5020	-3920	-3660	-3930	-3660	-4085	-3645	-4115	-3535	-4315	-3380	-4410	-3195
5010	-3915	-3660	-3925	-3655	-4075	-3645	-4110	-3395	-4140	-3375	-4410	-3185
5000	-3910	-3655	-3915	-3655	-3950	-3640	-4105	-3390	-4135	-3375	-4405	-3175
4990	-3905	-3655	-3910	-3650	-3945	-3635	-4100	-3390	-4130	-3375	-4400	-3175
4980	-3900	-3655	-3905	-3650	-3935	-3565	-4095	-3385	-4125	-3370	-4400	-3170
4970	-3895	-3650	-3900	-3645	-3925	-3550	-4090	-3385	-4120	-3370	-4395	-3165
4960	-3895	-3650	-3895	-3645	-3920	-3540	-4085	-3380	-4120	-3365	-4390	-3160
4950	-3890	-3645	-3895	-3640	-3910	-3400	-4075	-3380	-4115	-3365	-4380	-3155
4940	-3885	-3640	-3890	-3635	-3905	-3395	-3950	-3375	-4110	-3365	-4370	-3150
4930	-3885	-3640	-3890	-3570	-3900	-3390	-3940	-3375	-4105	-3360	-4360	-3150
4920	-3880	-3635	-3885	-3555	-3900	-3385	-3935	-3375	-4100	-3360	-4350	-3070
4910	-3880	-3565	-3880	-3545	-3895	-3385	-3925	-3370	-4095	-3360	-4345	-3055
4900	-3875	-3555	-3880	-3400	-3890	-3380	-3915	-3370	-4090	-3355	-4335	-3045
4890	-3870	-3545	-3875	-3395	-3890	-3380	-3910	-3365	-4080	-3355	-4330	-3040
4880	-3870	-3395	-3875	-3390	-3885	-3375	-3905	-3365	-3955	-3350	-4325	-3035
4870	-3865	-3390	-3870	-3385	-3885	-3375	-3900	-3365	-3945	-3190	-4315	-3025
4860	-3860	-3390	-3865	-3385	-3880	-3375	-3900	-3360	-3940	-3180	-4300	-3020
4850	-3855	-3385	-3865	-3380	-3875	-3370	-3895	-3360	-3930	-3175	-4135	-3010
4840	-3850	-3385	-3860	-3380	-3875	-3370	-3890	-3360	-3920	-3170	-4130	-2995
4830	-3795	-3380	-3855	-3375	-3870	-3370	-3890	-3355	-3915	-3170	-4125	-2970
4820	-3790	-3380	-3800	-3375	-3870	-3365	-3885	-3355	-3910	-3165	-4120	-2950
4810	-3785	-3375	-3795	-3375	-3865	-3365	-3885	-3350	-3905	-3160	-4115	-2940
4800	-3785	-3375	-3790	-3370	-3860	-3360	-3880	-3190	-3900	-3155	-4110	-2930

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
4790	-3780	-3370	-3785	-3370	-3855	-3360	-3875	-3180	-3895	-3150	-4105	-2920
4780	-3780	-3370	-3780	-3370	-3850	-3360	-3875	-3175	-3895	-3145	-4105	-2915
4770	-3775	-3370	-3780	-3365	-3795	-3355	-3870	-3170	-3890	-3070	-4100	-2910
4760	-3775	-3365	-3775	-3365	-3790	-3355	-3870	-3170	-3890	-3055	-4090	-2905
4750	-3770	-3365	-3775	-3360	-3785	-3350	-3865	-3165	-3885	-3045	-4085	-2900
4740	-3765	-3365	-3770	-3360	-3785	-3200	-3860	-3160	-3880	-3040	-4075	-2895
4730	-3765	-3360	-3770	-3360	-3780	-3185	-3855	-3155	-3880	-3035	-3950	-2895
4720	-3760	-3360	-3765	-3355	-3780	-3180	-3850	-3150	-3875	-3025	-3945	-2890
4710	-3760	-3355	-3765	-3355	-3775	-3175	-3795	-3150	-3875	-3020	-3935	-2885
4700	-3755	-3355	-3760	-3350	-3775	-3170	-3790	-3075	-3870	-3010	-3925	-2880
4690	-3655	-3355	-3755	-3195	-3770	-3165	-3785	-3055	-3865	-2995	-3920	-2875
4680	-3655	-3350	-3750	-3185	-3765	-3160	-3785	-3050	-3865	-2975	-3910	-2875
4670	-3650	-3190	-3655	-3180	-3765	-3160	-3780	-3040	-3860	-2955	-3905	-2870
4660	-3650	-3180	-3655	-3175	-3760	-3155	-3780	-3035	-3855	-2940	-3905	-2865
4650	-3645	-3175	-3650	-3170	-3755	-3150	-3775	-3025	-3845	-2930	-3900	-2855
4640	-3640	-3170	-3645	-3165	-3755	-3145	-3775	-3020	-3795	-2925	-3895	-2685
4630	-3635	-3165	-3645	-3160	-3655	-3060	-3770	-3010	-3790	-2915	-3890	-2675
4620	-3625	-3165	-3640	-3155	-3655	-3050	-3765	-3000	-3785	-2910	-3890	-2670
4610	-3530	-3160	-3635	-3155	-3650	-3045	-3765	-2980	-3785	-2905	-3885	-2665
4600	-3520	-3155	-3535	-3150	-3650	-3035	-3760	-2960	-3780	-2900	-3885	-2660
4590	-3515	-3150	-3530	-3145	-3645	-3030	-3755	-2945	-3775	-2900	-3880	-2655
4580	-3510	-3145	-3520	-3065	-3645	-3025	-3755	-2935	-3775	-2895	-3880	-2655
4570	-3505	-3140	-3515	-3050	-3640	-3015	-3660	-2925	-3770	-2890	-3875	-2650
4560	-3500	-3060	-3510	-3045	-3635	-3005	-3655	-2920	-3770	-2885	-3870	-2645
4550	-3495	-3050	-3505	-3035	-3540	-2990	-3655	-2915	-3765	-2885	-3870	-2645
4540	-3490	-3045	-3500	-3030	-3530	-2970	-3650	-2910	-3765	-2880	-3865	-2640
4530	-3490	-3035	-3495	-3025	-3525	-2950	-3650	-2905	-3760	-2875	-3860	-2635
4520	-3485	-3030	-3490	-3015	-3515	-2940	-3645	-2900	-3755	-2870	-3855	-2560
4510	-3480	-3020	-3485	-3005	-3510	-2930	-3640	-2895	-3750	-2865	-3850	-2555
4500	-3475	-3015	-3485	-2995	-3505	-2925	-3635	-2890	-3660	-2860	-3795	-2550
4490	-3470	-3005	-3480	-2975	-3500	-2915	-3630	-2890	-3655	-2800	-3790	-2545
4480	-3465	-2990	-3475	-2955	-3495	-2910	-3540	-2885	-3655	-2675	-3790	-2435
4470	-3370	-2970	-3470	-2945	-3490	-2905	-3530	-2880	-3650	-2670	-3785	-2430
4460	-3370	-2955	-3460	-2935	-3490	-2900	-3520	-2875	-3650	-2665	-3780	-2425
4450	-3370	-2940	-3370	-2925	-3485	-2900	-3515	-2870	-3645	-2660	-3780	-2420

CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF

RADIOCARBON AGE (BP) 5568 HALF-LIFE	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
4440	-3365	-2930	-3370	-2920	-3480	-2895	-3510	-2865	-3640	-2660	-3775	-2420
4430	-3365	-2925	-3370	-2915	-3475	-2890	-3505	-2860	-3640	-2655	-3775	-2415
4420	-3365	-2920	-3365	-2910	-3470	-2885	-3500	-2805	-3630	-2650	-3770	-2410
4410	-3360	-2915	-3365	-2905	-3465	-2885	-3495	-2680	-3540	-2645	-3770	-2410
4400	-3360	-2910	-3365	-2900	-3370	-2880	-3490	-2675	-3530	-2645	-3765	-2405
4390	-3360	-2905	-3360	-2895	-3370	-2875	-3485	-2665	-3520	-2640	-3760	-2405
4380	-3355	-2900	-3360	-2895	-3365	-2870	-3485	-2665	-3515	-2635	-3760	-2400
4370	-3355	-2895	-3355	-2890	-3365	-2865	-3480	-2660	-3510	-2635	-3755	-2395
4360	-3350	-2895	-3355	-2885	-3365	-2860	-3475	-2655	-3505	-2555	-3750	-2340
4350	-3350	-2890	-3355	-2880	-3360	-2805	-3470	-2650	-3500	-2550	-3660	-2330
4340	-3345	-2885	-3350	-2880	-3360	-2680	-3370	-2650	-3495	-2545	-3655	-2325
4330	-3345	-2880	-3350	-2875	-3360	-2670	-3370	-2645	-3490	-2435	-3655	-2320
4320	-3340	-2880	-3345	-2870	-3355	-2665	-3370	-2640	-3490	-2430	-3650	-2315
4310	-3335	-2875	-3345	-2865	-3355	-2665	-3365	-2640	-3485	-2425	-3650	-2310
4300	-3330	-2870	-3340	-2860	-3350	-2660	-3365	-2635	-3480	-2420	-3645	-2305
4290	-3155	-2865	-3335	-2800	-3350	-2655	-3365	-2560	-3475	-2420	-3640	-2215
4280	-3150	-2860	-3160	-2680	-3350	-2650	-3360	-2555	-3470	-2415	-3640	-2205
4270	-3145	-2805	-3155	-2670	-3345	-2650	-3360	-2550	-3460	-2415	-3630	-2195
4260	-3140	-2680	-3150	-2665	-3340	-2645	-3355	-2440	-3370	-2410	-3545	-2190
4250	-3130	-2670	-3145	-2660	-3340	-2640	-3355	-2430	-3370	-2405	-3535	-2180
4240	-3040	-2665	-3135	-2660	-3330	-2640	-3355	-2425	-3365	-2405	-3525	-2175
4230	-3030	-2665	-3045	-2655	-3160	-2635	-3350	-2425	-3365	-2400	-3515	-2170
4220	-3025	-2660	-3035	-2650	-3155	-2560	-3350	-2420	-3365	-2395	-3510	-2165
4210	-3015	-2655	-3030	-2650	-3150	-2555	-3345	-2415	-3360	-2395	-3505	-2155
4200	-3005	-2650	-3020	-2645	-3145	-2550	-3345	-2415	-3360	-2330	-3500	-2150
4190	-2970	-2650	-3015	-2640	-3135	-2440	-3340	-2410	-3355	-2325	-3495	-2140
4180	-2940	-2645	-3000	-2640	-3045	-2430	-3335	-2410	-3355	-2320	-3490	-2135
4170	-2930	-2640	-2965	-2635	-3035	-2425	-3160	-2405	-3355	-2315	-3490	-2125
4160	-2920	-2640	-2940	-2560	-3030	-2425	-3155	-2400	-3350	-2310	-3485	-2115
4150	-2915	-2635	-2925	-2550	-3020	-2420	-3150	-2400	-3350	-2305	-3480	-2100
4140	-2905	-2560	-2920	-2545	-3015	-2415	-3145	-2395	-3345	-2220	-3475	-2015
4130	-2900	-2550	-2910	-2435	-3000	-2415	-3140	-2335	-3340	-2205	-3470	-1995
4120	-2895	-2550	-2905	-2430	-2970	-2410	-3130	-2325	-3340	-2200	-3460	-1985
4110	-2895	-2435	-2900	-2425	-2945	-2410	-3040	-2320	-3330	-2190	-3370	-1980
4100	-2890	-2430	-2895	-2420	-2930	-2405	-3035	-2315	-3160	-2185	-3370	-1970

CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF

RADIOCARBON AGE (BP) 5568 HALF-LIFE	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
4090	-2885	-2425	-2895	-2420	-2920	-2400	-3025	-2310	-3155	-2180	-3365	-1965
4080	-2880	-2425	-2890	-2415	-2915	-2400	-3020	-2310	-3150	-2170	-3365	-1955
4070	-2875	-2420	-2885	-2415	-2910	-2395	-3010	-2305	-3145	-2165	-3360	-1945
4060	-2870	-2415	-2880	-2410	-2905	-2335	-2990	-2210	-3140	-2160	-3360	-1925
4050	-2865	-2415	-2875	-2405	-2900	-2325	-2960	-2200	-3130	-2150	-3360	-1905
4040	-2860	-2410	-2870	-2405	-2895	-2320	-2940	-2195	-3040	-2145	-3355	-1895
4030	-2795	-2410	-2865	-2400	-2890	-2315	-2930	-2185	-3035	-2135	-3355	-1890
4020	-2785	-2405	-2860	-2395	-2885	-2310	-2920	-2180	-3025	-2130	-3355	-1885
4010	-2780	-2400	-2795	-2395	-2885	-2310	-2915	-2175	-3020	-2120	-3350	-1875
4000	-2775	-2400	-2785	-2330	-2880	-2305	-2910	-2170	-3010	-2105	-3350	-1870
3990	-2770	-2395	-2780	-2325	-2875	-2210	-2905	-2160	-2995	-2035	-3345	-1865
3980	-2765	-2330	-2775	-2320	-2870	-2200	-2900	-2155	-2965	-2000	-3340	-1860
3970	-2755	-2325	-2770	-2315	-2865	-2190	-2895	-2150	-2945	-1990	-3335	-1780
3960	-2650	-2320	-2765	-2310	-2855	-2185	-2890	-2140	-2930	-1980	-3330	-1770
3950	-2645	-2315	-2760	-2305	-2795	-2180	-2885	-2130	-2920	-1975	-3160	-1765
3940	-2640	-2310	-2650	-2215	-2785	-2175	-2880	-2120	-2915	-1965	-3155	-1760
3930	-2640	-2305	-2645	-2205	-2780	-2165	-2880	-2110	-2910	-1955	-3150	-1750
3920	-2635	-2215	-2640	-2195	-2775	-2160	-2875	-2095	-2905	-1950	-3145	-1740
3910	-2630	-2205	-2640	-2190	-2770	-2155	-2870	-2010	-2900	-1930	-3140	-1730
3900	-2625	-2195	-2635	-2185	-2765	-2145	-2865	-1995	-2895	-1910	-3130	-1715
3890	-2620	-2190	-2630	-2180	-2755	-2140	-2855	-1985	-2890	-1900	-3040	-1705
3880	-2545	-2185	-2625	-2170	-2650	-2130	-2795	-1975	-2890	-1890	-3035	-1700
3870	-2540	-2180	-2620	-2165	-2645	-2120	-2785	-1970	-2885	-1885	-3025	-1695
3860	-2540	-2170	-2545	-2160	-2640	-2110	-2780	-1960	-2880	-1880	-3020	-1690
3850	-2535	-2165	-2540	-2150	-2640	-2090	-2775	-1950	-2875	-1875	-3010	-1685
3840	-2530	-2160	-2540	-2145	-2635	-2005	-2770	-1940	-2870	-1870	-2995	-1680
3830	-2530	-2150	-2535	-2135	-2630	-1990	-2765	-1915	-2865	-1865	-2965	-1675
3820	-2525	-2145	-2530	-2125	-2625	-1980	-2755	-1900	-2860	-1785	-2945	-1670
3810	-2525	-2135	-2530	-2115	-2620	-1975	-2650	-1895	-2845	-1775	-2935	-1665
3800	-2520	-2125	-2525	-2105	-2545	-1965	-2645	-1885	-2790	-1765	-2925	-1660
3790	-2515	-2115	-2525	-2025	-2540	-1960	-2640	-1880	-2785	-1760	-2915	-1655
3780	-2515	-2105	-2520	-2000	-2535	-1950	-2640	-1875	-2780	-1750	-2910	-1650
3770	-2510	-2025	-2515	-1990	-2535	-1935	-2635	-1870	-2770	-1745	-2905	-1640
3760	-2395	-2000	-2515	-1980	-2530	-1910	-2630	-1865	-2765	-1735	-2900	-1590
3750	-2395	-1990	-2510	-1970	-2530	-1900	-2625	-1790	-2760	-1720	-2895	-1575

CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF

RADIOCARBON AGE (BP) 5568 HALF-LIFE	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
3740	-2385	-1980	-2500	-1965	-2525	-1890	-2620	-1775	-2650	-1710	-2895	-1570
3730	-2325	-1970	-2395	-1955	-2525	-1885	-2545	-1770	-2645	-1700	-2890	-1560
3720	-2320	-1965	-2390	-1945	-2520	-1880	-2540	-1760	-2645	-1695	-2885	-1555
3710	-2315	-1955	-2325	-1925	-2515	-1875	-2535	-1755	-2640	-1690	-2880	-1550
3700	-2310	-1945	-2320	-1905	-2515	-1870	-2535	-1745	-2635	-1685	-2875	-1540
3690	-2310	-1925	-2315	-1895	-2510	-1865	-2530	-1735	-2630	-1680	-2875	-1535
3680	-2305	-1905	-2310	-1890	-2395	-1785	-2530	-1725	-2625	-1675	-2870	-1525
3670	-2300	-1895	-2310	-1885	-2390	-1775	-2525	-1710	-2620	-1670	-2860	-1440
3660	-2295	-1890	-2305	-1875	-2385	-1770	-2525	-1705	-2610	-1670	-2855	-1430
3650	-2285	-1885	-2300	-1870	-2325	-1760	-2520	-1695	-2540	-1665	-2790	-1425
3640	-2185	-1875	-2295	-1865	-2320	-1755	-2515	-1690	-2540	-1660	-2785	-1420
3630	-2180	-1870	-2285	-1860	-2315	-1745	-2515	-1685	-2535	-1655	-2780	-1415
3620	-2175	-1865	-2185	-1780	-2310	-1735	-2510	-1680	-2535	-1645	-2775	-1405
3610	-2170	-1860	-2180	-1770	-2305	-1720	-2395	-1680	-2530	-1635	-2770	-1400
3600	-2160	-1780	-2175	-1765	-2300	-1710	-2390	-1675	-2525	-1580	-2765	-1395
3590	-2155	-1770	-2170	-1755	-2295	-1705	-2385	-1670	-2525	-1570	-2755	-1390
3580	-2145	-1765	-2160	-1750	-2290	-1695	-2325	-1665	-2520	-1565	-2650	-1385
3570	-2140	-1755	-2155	-1740	-2285	-1690	-2320	-1660	-2520	-1555	-2645	-1375
3560	-2130	-1750	-2145	-1730	-2185	-1685	-2315	-1655	-2515	-1550	-2640	-1370
3550	-2120	-1740	-2140	-1715	-2180	-1680	-2310	-1650	-2510	-1545	-2635	-1360
3540	-2110	-1730	-2130	-1705	-2170	-1675	-2305	-1640	-2505	-1535	-2635	-1355
3530	-2090	-1715	-2120	-1700	-2165	-1675	-2300	-1585	-2395	-1530	-2630	-1345
3520	-2005	-1705	-2110	-1695	-2160	-1670	-2295	-1575	-2390	-1450	-2625	-1335
3510	-1995	-1700	-2095	-1690	-2150	-1665	-2290	-1565	-2325	-1435	-2615	-1325
3500	-1985	-1695	-2005	-1685	-2145	-1660	-2280	-1560	-2320	-1430	-2545	-1270
3490	-1975	-1690	-1995	-1680	-2135	-1655	-2185	-1555	-2315	-1420	-2540	-1255
3480	-1970	-1685	-1985	-1675	-2125	-1650	-2175	-1545	-2310	-1415	-2535	-1250
3470	-1960	-1680	-1975	-1670	-2115	-1640	-2170	-1540	-2305	-1410	-2535	-1140
3460	-1950	-1675	-1970	-1665	-2105	-1585	-2165	-1535	-2305	-1405	-2530	-1130
3450	-1940	-1670	-1960	-1665	-2080	-1575	-2160	-1525	-2300	-1400	-2530	-1125
3440	-1920	-1670	-1955	-1660	-2000	-1565	-2150	-1440	-2295	-1390	-2525	-1125
3430	-1905	-1665	-1940	-1655	-1990	-1560	-2145	-1430	-2285	-1385	-2525	-1120
3420	-1895	-1660	-1920	-1645	-1980	-1555	-2135	-1425	-2185	-1380	-2520	-1115
3410	-1890	-1655	-1905	-1635	-1975	-1545	-2125	-1420	-2180	-1375	-2515	-1115
3400	-1885	-1645	-1895	-1585	-1965	-1540	-2115	-1415	-2175	-1365	-2510	-1110

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
3390	-1875	-1635	-1890	-1575	-1960	-1535	-2100	-1405	-2165	-1360	-2505	-1105
3380	-1870	-1585	-1885	-1565	-1950	-1525	-2020	-1400	-2160	-1350	-2395	-1105
3370	-1865	-1575	-1875	-1560	-1935	-1440	-2000	-1395	-2155	-1340	-2390	-1100
3360	-1860	-1565	-1870	-1550	-1910	-1435	-1990	-1390	-2145	-1330	-2380	-935
3350	-1855	-1560	-1865	-1545	-1900	-1425	-1980	-1385	-2140	-1315	-2320	-925
3340	-1845	-1555	-1860	-1540	-1890	-1420	-1970	-1375	-2130	-1260	-2320	-920
3330	-1765	-1545	-1855	-1530	-1885	-1415	-1965	-1370	-2120	-1255	-2315	-915
3320	-1760	-1540	-1845	-1520	-1880	-1410	-1955	-1360	-2110	-1145	-2310	-910
3310	-1750	-1530	-1765	-1440	-1875	-1400	-1945	-1355	-2090	-1135	-2305	-905
3300	-1740	-1525	-1760	-1430	-1870	-1395	-1930	-1345	-2005	-1130	-2300	-905
3290	-1730	-1445	-1750	-1425	-1865	-1390	-1910	-1335	-1990	-1125	-2295	-900
3280	-1715	-1435	-1740	-1420	-1860	-1385	-1900	-1325	-1985	-1120	-2290	-895
3270	-1705	-1425	-1730	-1415	-1850	-1380	-1890	-1270	-1975	-1120	-2275	-890
3260	-1695	-1420	-1715	-1410	-1770	-1370	-1885	-1260	-1965	-1115	-2180	-885
3250	-1690	-1415	-1705	-1400	-1760	-1365	-1880	-1250	-1960	-1110	-2175	-880
3240	-1685	-1410	-1695	-1395	-1755	-1355	-1875	-1140	-1950	-1110	-2170	-870
3230	-1680	-1405	-1690	-1390	-1745	-1345	-1870	-1130	-1940	-1105	-2165	-860
3220	-1675	-1400	-1685	-1385	-1735	-1340	-1865	-1125	-1915	-1100	-2155	-845
3210	-1670	-1395	-1680	-1380	-1720	-1325	-1860	-1125	-1900	-1095	-2150	-835
3200	-1670	-1385	-1675	-1370	-1710	-1275	-1850	-1120	-1895	-930	-2140	-830
3190	-1665	-1380	-1675	-1365	-1700	-1260	-1770	-1115	-1885	-920	-2135	-825
3180	-1660	-1375	-1670	-1355	-1695	-1250	-1760	-1115	-1880	-915	-2125	-820
3170	-1650	-1365	-1665	-1350	-1690	-1140	-1755	-1110	-1875	-910	-2110	-815
3160	-1645	-1360	-1660	-1340	-1685	-1130	-1745	-1105	-1870	-910	-2095	-810
3150	-1585	-1350	-1655	-1330	-1680	-1130	-1735	-1105	-1865	-905	-2010	-805
3140	-1575	-1345	-1645	-1310	-1675	-1125	-1720	-1100	-1860	-900	-1995	-805
3130	-1565	-1335	-1625	-1260	-1670	-1120	-1710	-935	-1855	-895	-1985	-800
3120	-1560	-1320	-1575	-1255	-1665	-1115	-1700	-925	-1840	-895	-1975	-795
3110	-1555	-1265	-1570	-1140	-1660	-1115	-1695	-920	-1765	-890	-1970	-795
3100	-1545	-1255	-1560	-1135	-1655	-1110	-1690	-915	-1755	-885	-1960	-790
3090	-1540	-1145	-1555	-1130	-1650	-1105	-1685	-910	-1750	-875	-1955	-790
3080	-1530	-1135	-1545	-1125	-1640	-1105	-1680	-905	-1740	-865	-1945	-785
3070	-1520	-1130	-1540	-1120	-1585	-1100	-1675	-905	-1725	-850	-1925	-785
3060	-1430	-1125	-1535	-1115	-1575	-935	-1670	-900	-1710	-840	-1905	-780
3050	-1425	-1120	-1525	-1115	-1565	-925	-1665	-895	-1705	-830	-1895	-775

CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF

RADIOCARBON AGE (BP) 5568 HALF-LIFE	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
3040	-1420	-1120	-1505	-1110	-1560	-920	-1660	-890	-1695	-825	-1890	-645
3030	-1410	-1115	-1425	-1105	-1550	-915	-1655	-885	-1690	-820	-1885	-635
3020	-1405	-1110	-1420	-1105	-1545	-910	-1650	-880	-1685	-815	-1875	-630
3010	-1400	-1110	-1415	-1100	-1540	-905	-1640	-870	-1680	-810	-1870	-625
3000	-1395	-1105	-1405	-935	-1530	-905	-1585	-860	-1675	-810	-1865	-620
2990	-1385	-1100	-1400	-925	-1520	-900	-1575	-845	-1670	-805	-1860	-615
2980	-1380	-1095	-1395	-920	-1435	-895	-1565	-835	-1670	-800	-1855	-610
2970	-1370	-925	-1390	-915	-1425	-890	-1560	-830	-1665	-800	-1845	-605
2960	-1365	-920	-1380	-910	-1420	-885	-1550	-825	-1660	-795	-1765	-600
2950	-1355	-915	-1375	-905	-1415	-880	-1545	-820	-1655	-795	-1760	-595
2940	-1345	-910	-1365	-905	-1405	-870	-1540	-815	-1645	-790	-1750	-590
2930	-1335	-910	-1360	-900	-1400	-860	-1530	-810	-1630	-785	-1740	-580
2920	-1325	-905	-1350	-895	-1395	-845	-1520	-805	-1580	-785	-1730	-440
2910	-1270	-900	-1340	-890	-1390	-835	-1435	-805	-1570	-780	-1715	-430
2900	-1260	-895	-1330	-885	-1380	-830	-1425	-800	-1560	-780	-1705	-430
2890	-1250	-890	-1310	-880	-1375	-825	-1420	-795	-1555	-655	-1700	-425
2880	-1245	-885	-1260	-870	-1370	-820	-1415	-795	-1550	-640	-1690	-420
2870	-1240	-880	-1255	-860	-1360	-815	-1410	-790	-1540	-635	-1685	-420
2860	-1235	-875	-1250	-845	-1350	-810	-1400	-790	-1535	-630	-1680	-415
2850	-1235	-860	-1245	-835	-1340	-805	-1395	-785	-1525	-625	-1680	-410
2840	-1230	-850	-1240	-830	-1330	-805	-1390	-785	-1515	-620	-1675	-410
2830	-1225	-835	-1235	-825	-1315	-800	-1385	-780	-1430	-615	-1670	-410
2820	-1220	-830	-1230	-820	-1265	-795	-1375	-775	-1425	-610	-1665	-405
2810	-1215	-825	-1225	-815	-1255	-795	-1370	-645	-1415	-605	-1660	-405
2800	-1210	-820	-1225	-810	-1250	-790	-1360	-640	-1410	-600	-1655	-400
2790	-1105	-815	-1220	-805	-1245	-790	-1355	-630	-1405	-590	-1650	-400
2780	-1100	-810	-1210	-805	-1240	-785	-1345	-625	-1400	-585	-1640	-395
2770	-1095	-805	-1105	-800	-1235	-785	-1335	-620	-1395	-440	-1585	-395
2760	-1090	-805	-1105	-795	-1230	-780	-1320	-615	-1385	-435	-1570	-390
2750	-1075	-800	-1100	-795	-1225	-775	-1265	-610	-1380	-430	-1565	-390
2740	-1045	-800	-1095	-790	-1225	-645	-1255	-605	-1375	-425	-1560	-385
2730	-1035	-795	-1085	-790	-1220	-640	-1250	-600	-1365	-425	-1550	-285
2720	-1030	-790	-1045	-785	-1215	-630	-1245	-595	-1355	-420	-1545	-270
2710	-1025	-790	-1040	-785	-1105	-625	-1240	-590	-1350	-415	-1540	-255
2700	-1020	-785	-1035	-780	-1105	-620	-1235	-580	-1340	-415	-1530	-210

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
2690	-1020	-785	-1030	-775	-1100	-615	-1230	-440	-1330	-410	-1520	-200
2680	-1015	-780	-1025	-650	-1095	-615	-1230	-435	-1275	-410	-1435	-195
2670	-1005	-775	-1020	-640	-1085	-610	-1225	-430	-1260	-405	-1425	-190
2660	-885	-655	-1015	-635	-1045	-600	-1220	-425	-1255	-405	-1420	-185
2650	-880	-640	-1010	-625	-1040	-595	-1215	-420	-1245	-400	-1415	-180
2640	-875	-635	-1000	-625	-1035	-590	-1205	-420	-1245	-400	-1410	-180
2630	-860	-630	-880	-620	-1030	-580	-1105	-415	-1240	-395	-1400	-175
2620	-845	-625	-875	-615	-1025	-440	-1100	-415	-1235	-395	-1395	-170
2610	-835	-620	-865	-610	-1020	-435	-1095	-410	-1230	-395	-1390	-165
2600	-830	-615	-850	-605	-1015	-430	-1085	-410	-1225	-390	-1385	-165
2590	-825	-610	-840	-595	-1010	-425	-1045	-405	-1220	-390	-1375	-160
2580	-820	-605	-830	-590	-1000	-420	-1040	-405	-1215	-385	-1370	-155
2570	-815	-600	-825	-585	-880	-420	-1035	-400	-1210	-275	-1360	-155
2560	-810	-595	-820	-440	-875	-415	-1030	-400	-1105	-265	-1355	-45
2550	-805	-585	-815	-435	-865	-415	-1025	-395	-1100	-245	-1345	-35
2540	-805	-445	-810	-430	-850	-410	-1020	-395	-1095	-205	-1335	-30
2530	-800	-435	-810	-425	-840	-410	-1015	-390	-1090	-195	-1320	-25
2520	-800	-430	-805	-420	-830	-405	-1010	-390	-1050	-190	-1265	-20
2510	-795	-425	-800	-420	-825	-405	-1000	-385	-1040	-185	-1255	-15
2500	-790	-425	-800	-415	-820	-400	-880	-385	-1035	-185	-1250	-5
2490	-790	-420	-795	-415	-815	-400	-875	-270	-1030	-180	-1245	-1/1
2480	-785	-415	-790	-410	-810	-395	-865	-260	-1025	-175	-1240	-1/1
2470	-785	-415	-790	-410	-810	-395	-850	-210	-1020	-170	-1235	10
2460	-780	-410	-785	-405	-805	-390	-840	-200	-1015	-170	-1230	15
2450	-775	-410	-785	-405	-800	-390	-830	-195	-1010	-165	-1230	25
2440	-775	-405	-780	-400	-800	-385	-825	-190	-1005	-160	-1225	30
2430	-770	-405	-780	-400	-795	-385	-820	-185	-885	-160	-1220	35
2420	-770	-400	-775	-395	-790	-275	-815	-180	-880	-155	-1215	40
2410	-765	-400	-770	-395	-790	-260	-810	-180	-870	-50	-1205	45
2400	-760	-400	-770	-395	-785	-215	-810	-175	-855	-40	-1105	190
2390	-755	-395	-765	-390	-785	-200	-805	-170	-845	-35	-1100	195
2380	-755	-395	-760	-390	-780	-195	-800	-165	-835	-25	-1095	200
2370	-750	-390	-760	-385	-780	-190	-800	-165	-830	-20	-1085	205
2360	-740	-390	-755	-275	-775	-185	-795	-160	-820	-15	-1045	205
2350	-590	-385	-750	-265	-770	-180	-790	-155	-820	-10	-1040	210

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF											
	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
2340	-580	-285	-740	-245	-770	-180	-790	-150	-815	-5	-1035	210
2330	-575	-270	-595	-205	-765	-175	-785	-45	-810	-1/1	-1030	215
2320	-560	-255	-585	-195	-760	-170	-785	-35	-805	5	-1025	215
2310	-550	-205	-575	-190	-760	-170	-780	-30	-805	15	-1020	220
2300	-535	-200	-565	-185	-755	-165	-780	-25	-800	20	-1015	220
2290	-420	-190	-555	-180	-750	-160	-775	-20	-795	25	-1010	225
2280	-420	-190	-540	-180	-740	-155	-770	-15	-795	30	-1000	225
2270	-415	-185	-525	-175	-595	-155	-770	-5	-790	35	-880	230
2260	-415	-180	-420	-170	-585	-45	-765	-1/1	-790	40	-875	230
2250	-410	-175	-415	-170	-580	-35	-760	5	-785	45	-865	235
2240	-410	-170	-415	-165	-565	-30	-760	10	-780	190	-850	235
2230	-405	-170	-410	-160	-555	-25	-755	15	-780	195	-840	240
2220	-405	-165	-410	-155	-545	-20	-750	25	-775	200	-830	240
2210	-400	-160	-405	-155	-525	-15	-745	30	-775	205	-825	245
2200	-400	-160	-405	-45	-420	-5	-595	35	-770	205	-820	250
2190	-395	-155	-400	-35	-415	-1/1	-590	40	-765	210	-815	315
2180	-395	-45	-400	-30	-415	-1/1	-580	45	-765	215	-810	330
2170	-390	-35	-395	-25	-410	10	-570	185	-760	215	-810	345
2160	-390	-30	-395	-20	-410	15	-555	195	-755	220	-805	360
2150	-385	-25	-390	-15	-405	25	-545	200	-750	220	-800	385
2140	-385	-20	-390	-5	-405	30	-530	205	-745	225	-800	400
2130	-380	-15	-390	-1/1	-400	35	-420	205	-735	225	-795	410
2120	-380	-10	-385	5	-400	40	-415	210	-590	225	-790	415
2110	-375	-1/1	-385	10	-395	45	-415	210	-585	230	-790	420
2100	-375	-1/1	-380	15	-395	185	-410	215	-575	230	-785	425
2090	-370	10	-375	25	-395	195	-410	215	-565	235	-785	435
2080	-365	15	-375	30	-390	200	-405	220	-550	240	-780	440
2070	-355	20	-370	35	-390	200	-405	220	-540	240	-780	445
2060	-185	25	-365	40	-385	205	-400	225	-520	245	-775	450
2050	-180	35	-360	45	-385	210	-400	225	-420	250	-770	460
2040	-175	40	-185	185	-380	210	-400	230	-415	250	-770	550
2030	-170	40	-180	195	-380	215	-395	230	-415	325	-765	560
2020	-170	45	-175	200	-375	215	-395	235	-410	335	-760	565
2010	-165	190	-175	200	-370	220	-390	235	-410	350	-760	570
2000	-160	195	-170	205	-365	220	-390	240	-405	370	-755	575

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF											
	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
1990	-160	200	-165	210	-360	225	-385	240	-405	390	-750	575
1980	-155	205	-165	210	-185	225	-385	245	-400	405	-740	580
1970	-150	205	-160	215	-180	230	-380	250	-400	410	-595	585
1960	-145	210	-155	215	-175	230	-380	315	-395	420	-590	585
1950	-145	215	-155	220	-175	235	-375	330	-395	425	-580	590
1940	-135	215	-150	220	-170	235	-370	345	-390	430	-570	595
1930	-125	220	-145	225	-165	240	-370	360	-390	435	-560	595
1920	-20	220	-140	225	-165	240	-365	380	-390	440	-545	600
1910	-15	225	-130	230	-160	245	-185	400	-385	450	-530	605
1900	-10	225	-20	230	-155	250	-180	410	-385	455	-420	605
1890	-1/1	225	-15	235	-155	255	-180	415	-380	545	-420	610
1880	-1/1	230	-10	235	-150	330	-175	420	-375	555	-415	610
1870	10	230	-5	240	-145	340	-170	425	-375	560	-410	615
1860	15	235	-1/1	240	-140	355	-165	435	-370	565	-410	620
1850	25	240	5	245	-130	380	-165	440	-365	570	-405	620
1840	30	240	15	250	-20	395	-160	445	-360	575	-405	625
1830	35	245	20	255	-15	405	-155	450	-185	580	-405	630
1820	40	250	25	330	-10	415	-155	460	-180	580	-400	635
1810	45	255	35	340	-1/1	420	-150	550	-175	585	-400	640
1800	45	325	40	355	-1/1	425	-145	560	-170	590	-395	640
1790	50	335	40	380	10	430	-140	565	-170	590	-395	645
1780	55	350	45	395	15	440	-130	570	-165	595	-390	650
1770	60	370	50	405	20	445	-20	575	-160	600	-390	750
1760	65	395	55	415	25	450	-15	575	-160	600	-385	760
1750	70	405	60	420	35	455	-10	580	-155	605	-385	765
1740	70	410	60	425	40	550	-5	585	-150	605	-380	770
1730	75	420	65	430	40	560	-1/1	585	-145	610	-380	775
1720	80	425	70	440	45	565	5	590	-140	615	-375	785
1710	90	430	75	445	50	570	15	595	-135	615	-370	790
1700	220	435	80	450	55	570	20	595	-125	620	-370	850
1690	225	440	85	455	60	575	25	600	-20	625	-365	860
1680	225	450	100	550	65	580	30	600	-10	630	-185	865
1670	230	455	225	555	65	585	35	605	-5	630	-180	870
1660	230	545	225	565	70	585	40	610	-1/1	635	-180	875
1650	235	555	230	570	75	590	45	610	5	640	-175	880

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
1640	240	560	230	570	80	595	50	615	10	645	-170	885
1630	240	565	235	575	85	595	55	620	20	650	-165	885
1620	245	570	235	580	100	600	60	620	25	740	-165	890
1610	245	575	240	585	225	600	60	625	30	755	-160	895
1600	250	580	245	585	225	605	65	630	35	760	-155	895
1590	260	580	245	590	230	610	70	635	40	770	-155	900
1580	335	585	250	590	230	610	75	635	45	775	-150	905
1570	345	590	255	595	235	615	80	640	50	780	-145	905
1560	365	590	270	600	235	620	85	645	50	785	-140	910
1550	390	595	345	600	240	620	95	650	55	795	-130	915
1540	400	595	360	605	245	625	225	750	60	855	-20	995
1530	410	600	385	610	245	630	225	755	65	860	-15	1010
1520	415	605	400	610	250	630	230	765	70	865	-10	1015
1510	425	605	410	615	255	635	230	770	75	870	-1/1	1020
1500	430	610	415	615	265	640	235	775	80	875	-1/1	1025
1490	435	615	420	620	345	645	235	780	85	880	10	1030
1480	440	615	425	625	360	650	240	790	90	885	15	1035
1470	445	620	435	630	385	745	240	845	220	885	20	1040
1460	455	625	440	630	400	755	245	855	225	890	25	1040
1450	460	625	445	635	410	765	250	865	225	895	35	1045
1440	470	630	450	640	415	770	255	870	230	900	40	1050
1430	565	635	460	645	420	775	265	875	230	900	40	1055
1420	570	640	470	650	425	780	340	880	235	905	45	1130
1410	570	640	560	655	435	785	355	880	240	910	50	1145
1400	575	645	565	755	440	795	380	885	240	915	55	1160
1390	580	650	570	760	445	855	395	890	245	915	60	1175
1380	585	750	575	765	450	860	405	890	245	1005	60	1190
1370	585	760	580	775	460	865	415	895	250	1015	65	1200
1360	590	765	580	780	465	870	420	900	260	1020	70	1205
1350	595	770	585	785	560	875	425	900	335	1025	75	1210
1340	595	775	590	795	565	880	430	905	350	1030	80	1220
1330	600	780	590	850	570	885	440	910	365	1030	85	1225
1320	605	790	595	860	575	885	445	915	390	1035	95	1225
1310	605	800	600	865	580	890	450	920	400	1040	225	1230
1300	610	855	600	870	580	895	455	1005	410	1045	225	1235

CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF

RADIOCARBON AGE (BP) 5568 HALF-LIFE	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
1290	610	860	605	875	585	900	465	1015	415	1045	230	1240
1280	615	865	610	880	590	900	485	1020	425	1050	230	1245
1270	620	870	610	880	590	905	565	1025	430	1055	235	1245
1260	620	875	615	885	595	910	570	1030	435	1135	235	1250
1250	625	880	620	890	600	910	575	1035	440	1150	240	1255
1240	630	885	620	895	600	915	580	1035	445	1165	240	1255
1230	635	885	625	895	605	1005	580	1040	455	1180	245	1260
1220	640	890	630	900	605	1010	585	1045	460	1195	250	1265
1210	645	895	630	905	610	1020	590	1050	470	1200	255	1270
1200	645	895	635	905	615	1025	590	1050	560	1210	265	1275
1190	655	900	640	910	615	1025	595	1055	565	1215	340	1280
1180	660	905	645	915	620	1030	595	1140	570	1220	355	1285
1170	665	910	650	920	625	1035	600	1155	575	1225	380	1300
1160	675	910	655	1010	630	1040	605	1170	580	1230	395	1310
1150	775	915	665	1015	630	1045	605	1185	585	1235	405	1320
1140	780	1000	670	1020	635	1045	610	1195	585	1235	415	1325
1130	785	1010	770	1025	640	1050	615	1205	590	1240	420	1325
1120	800	1015	775	1030	645	1055	615	1210	590	1245	425	1330
1110	860	1020	785	1035	650	1135	620	1215	595	1245	430	1335
1100	865	1025	790	1035	655	1150	625	1220	600	1250	440	1335
1090	870	1030	855	1040	660	1160	625	1225	600	1255	445	1340
1080	875	1035	865	1045	670	1180	630	1230	605	1260	450	1345
1070	880	1040	870	1050	770	1190	635	1235	610	1260	455	1350
1060	885	1040	875	1055	775	1200	640	1240	610	1265	465	1355
1050	885	1045	875	1055	780	1210	645	1240	615	1270	485	1390
1040	890	1050	880	1140	790	1215	650	1245	620	1275	565	1395
1030	895	1055	885	1155	800	1220	655	1250	620	1280	570	1400
1020	900	1130	890	1170	860	1225	660	1250	625	1290	575	1400
1010	900	1145	890	1185	865	1230	665	1255	630	1305	575	1405
1000	905	1160	895	1195	870	1230	680	1260	630	1315	580	1405
990	910	1175	900	1205	875	1235	775	1260	635	1320	585	1410
980	910	1190	900	1210	880	1240	780	1265	640	1325	585	1410
970	915	1200	905	1215	885	1245	785	1270	645	1325	590	1415
960	920	1205*	910	1220	885	1245	795	1275	650	1330	595	1415
950	930	1210*	915	1225	890	1250	855	1285	655	1335*	595	1415

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
940	1020	1215	920	1230	895	1255	865	1295	660	1340*	600	1420
930	1025	1220	925	1235*	895	1255	870	1310	670	1340*	605	1420
920	1030	1225	930	1235*	900	1260	875	1315	770	1345	605	1425
910	1030	1230	1020	1240	905	1265	880	1320	775	1350	610	1425
900	1035	1235	1025	1245	910	1270	880	1325	780	1360	610	1430
890	1040	1240	1030	1250	910	1275	885	1330	790	1390	615	1435
880	1045	1240	1035	1250	915	1280	890	1330	850	1395	620	1440
870	1045	1245	1035	1255	920	1290*	890	1335	860	1400	620	1485
860	1050	1250	1040	1260	925	1305*	895	1340	865	1400	625	1490
850	1055	1255	1045	1260	935	1315*	900	1345	870	1405	630	1495
840	1060	1255*	1050	1265	1025	1320	905	1345	875	1405	635	1495
830	1155	1260	1055	1270	1025	1325	905	1355	880	1410	640	1500
820	1170	1265	1060	1275*	1030	1325	910	1385	885	1410	640	1505
810	1185	1265	1065	1285*	1035	1330	915	1395	885	1415	645	1510
800	1195	1270	1160	1295	1040	1335	920	1395	890	1415	650	1520
790	1205	1275	1175	1310	1040	1335	925	1400*	895	1420	660	1605*
780	1210	1285	1190	1315	1045	1340	935	1405*	895	1420	665	1620*
770	1215	1300	1200	1320	1050	1345	1020	1405	900	1420	675	1630*
760	1220	1310	1205	1325	1055	1350	1025	1410	905	1425	770	1635
750	1225	1315	1210	1330	1060	1360*	1030	1410	910	1425	780	1640
740	1230	1320	1215	1330	1070	1390*	1035	1410	910	1430	785	1645
730	1235	1325	1220	1335	1165	1395	1035	1415	915	1435	795	1650
720	1235	1330	1225	1340	1180	1400	1040	1415	920	1480*	855	1650
710	1240	1335	1230	1340	1195	1400	1045	1420	925	1485*	860	1655
700	1245	1335	1235	1345	1200	1405	1050	1420	935	1490*	870	1655
690	1250	1340	1240	1350	1210	1405	1055	1425	1025	1495	870	1660
680	1250	1345	1240	1385	1215	1410	1060	1425*	1025	1500	875	1660
670	1255	1350	1245	1395	1220	1410	1065	1430*	1030	1505	880	1665
660	1260	1355	1250	1395	1225	1415	1160	1430	1035	1510	885	1790*
650	1265	1390	1255	1400	1230	1415	1175	1435	1040	1515	890	1795*
640	1265	1395	1255	1405	1235	1415	1190	1480	1040	1525	890	1800*
630	1270	1400	1260	1405	1235	1420	1200	1485	1045	1610*	895	1950*
620	1275	1400	1265	1405	1240	1420	1205	1490	1050	1625	900	1950*
610	1285	1405	1270	1410	1245	1425	1210	1495	1055	1630	900	1950*
600	1300	1405	1270	1410	1245	1425	1215	1500	1060	1640*	905	1950*

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF											
	SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
590	1310	1410	1280	1415	1250	1430	1220	1505	1070	1645*	910	1950*
580	1315	1410	1285	1415	1255	1435	1225	1510	1165	1645	915	1950*
570	1320	1410	1305	1420	1260	1475	1230	1515	1180	1650	920	1950*
560	1325	1415	1315	1420	1260	1485	1235	1595*	1195	1650	925	1950*
550	1330	1415	1320	1425	1265	1490	1240	1615	1200	1655	930	1950*
540	1335	1420	1325	1425	1270	1495	1240	1625	1210	1655	1020	1950
530	1335	1420	1325	1430	1275	1500	1245	1635	1215	1660	1025	1950
520	1340	1425	1330	1430	1280	1500	1250	1640	1220	1660	1030	1950
510	1345	1425	1335	1435	1295	1505	1255	1645	1225	1665	1030	1950
500	1350	1430	1335	1480	1310	1515	1255	1645	1230	1790*	1035	1950
490	1355	1430	1340	1485	1315	1520	1260	1650	1230	1795*	1040	1950
480	1390	1435	1345	1490	1320	1605*	1265	1655	1235	1800*	1045	1950
470	1395	1480	1350	1495	1325	1620	1270	1655	1240	1950*	1045	1950
460	1400	1485	1385	1500	1330	1630	1270	1655	1245	1950*	1050	1950
450	1400	1490	1390	1505	1330	1635	1280	1660	1245	1950*	1055	1950
440	1405	1495	1395	1510	1335	1640	1285	1660	1250	1950*	1060	1950*
430	1405	1500	1400	1515	1340	1645	1305	1665	1255	1950*	1155	1950
420	1410	1505	1400	1525	1340	1650	1315	1790*	1255	1950*	1170	1950
410	1410	1510	1405	1605*	1345	1650	1320	1795*	1260	1950*	1185	1950
400	1415	1515	1405	1620	1350	1655	1325	1800*	1265	1950	1195	1950
390	1415	1525	1410	1630	1385	1655	1325	1950*	1270	1950	1205	1950
380	1415	1605	1410	1635	1395	1660	1330	1950*	1275	1950	1210	1950
370	1420	1620	1415	1640	1395	1660	1335	1950*	1280	1950	1215	1950
360	1420	1630	1415	1645	1400	1660	1335	1950*	1290	1950	1220	1950
350	1425	1635	1420	1650	1405	1665	1340	1950*	1305	1950	1225	1950
340	1425	1640	1420	1650	1405	1795*	1345	1950*	1315	1950	1230	1950
330	1430	1645	1420	1655	1410	1795*	1350	1950	1320	1950	1235	1950
320	1435	1650	1425	1655	1410	1800*	1355	1950	1325	1950	1235	1950
310	1440	1650	1425	1660	1410	1950*	1390	1950	1330	1950	1240	1950
300	1485	1655	1430	1660	1415	1950*	1395	1950	1330	1950	1245	1950
290	1490	1655	1435	1665	1415	1950*	1400	1950	1335	1950	1250	1950
280	1495	1660	1480	1665	1420	1950*	1400	1950	1340	1950	1250	1950
270	1500	1660	1485	1795*	1420	1950*	1405	1950	1340	1950	1255	1950
260	1505	1660	1490	1795*	1425	1950*	1405	1950	1345	1950	1260	1950
250	1510	1665	1495	1800*	1425	1950	1410	1950	1350	1950	1260	1950

RADIOCARBON AGE (BP) 5568 HALF-LIFE	CALIBRATED RANGES (95% CONFIDENCE) FOR MEASUREMENT UNCERTAINTIES OF SIGMA= 20 YRS.		SIGMA= 50 YRS.		SIGMA=100 YRS.		SIGMA=150 YRS.		SIGMA=200 YRS.		SIGMA=300 YRS.	
240	1515	1790*	1500	1950*	1430	1950	1410	1950	1385	1950	1265	1950
230	1525	1795*	1505	1950*	1430	1950	1415	1950	1395	1950	1270	1950
220	1620	1800*	1510	1950*	1435	1950	1415	1950	1395	1950	1275	1950
210	1630	1950*	1515	1950*	1480	1950	1415	1950	1400	1950	1285	1950
200	1640	1950*	1525	1950*	1485	1950	1420	1950	1405	1950	1295	1950
190	1645	1950*	1620	1950*	1490	1950	1420	1950	1405	1950	1310	1950
180	1645	1950*	1630	1950	1495	1950	1425	1950	1405	1950	1315	1950
170	1650	1950*	1640	1950	1500	1950	1425	1950	1410	1950	1320	1950
160	1650	1950*	1645	1950	1505	1950	1430	1950	1410	1950	1325	1950
150	1655	1950	1645	1950	1510	1950	1435	1950	1415	1950	1330	1950
140	1655	1950	1650	1950	1520	1950	1480	1950	1415	1950	1330	1950
130	1660	1945	1650	1950	1530	1950*	1485	1950	1420	1950	1335	1950
120	1660	1945	1655	1950	1625	1950	1490	1950	1420	1950	1340	1950
110	1665	1940	1655	1950	1630	1950	1495	1950	1425	1950	1345	1950
100	1665	1940*	1660	1945	1640	1950	1500	1950	1425	1950	1345	1950
90	1670	1935*	1660	1945	1645	1950	1505	1950	1430	1950	1355	1950
80	1670	1935*	1665	1940	1645	1950	1510	1950	1430	1950	1390	1950
70	1675	1930*	1665	1940*	1650	1950	1515	1950	1435	1950	1395	1950
60	1675	1930*	1670	1935*	1650	1950	1525	1950*	1480	1950	1400	1950
50	1680	1925*	1670	1935*	1655	1950	1615	1950	1485	1950	1400	1950
40	1680	1920*	1670	1930*	1655	1950	1625	1950	1490	1950	1405	1950
30	1815	1920*	1675	1930*	1660	1945	1635	1950	1495	1950	1405	1950
20	1820	1915*	1680	1925*	1660	1945	1640	1950	1500	1950	1410	1950
10			1680	1920*	1665	1940	1645	1950	1505	1950	1410	1950

TABLE 3

SUPPLEMENTARY CALIBRATION TABLES FOR THE MOST RECENT 1000 YEARS

This table lists calibration intervals only for the starred values in the main table, *ie,* only for ages consistent with more than one calibration interval

Spaces between rows indicate steps of more than 10 years between tabulated radiocarbon ages.

SUPPLEMENTARY TABLES FOR SIGMA = 20

RADIOCARBON AGE (BP)	CALIBRATED RANGES (95% CONFIDENCE)							
960	920	980	1005	1205				
950	930	970	1015	1210				
840	1060	1100	1140	1255				
240	1515	1665	1760	1790				
230	1525	1570	1605	1670	1725	1795		
220	1620	1670	1720	1800				
210	1630	1675	1715	1805	1930	1950		
200	1640	1675	1710	1805	1925	1950		
190	1645	1680	1705	1810	1850	1875	1925	1950
180	1645	1810	1845	1880	1920	1950		
170	1650	1815	1840	1885	1915	1950		
160	1650	1890	1915	1950				
100	1665	1765	1790	1940				
90	1670	1730	1795	1935				
80	1670	1720	1800	1935				
70	1675	1715	1800	1930				
60	1675	1710	1805	1930				
50	1680	1705	1810	1855	1875	1925		
40	1680	1700	1810	1850	1880	1920		
30	1815	1845	1885	1920				
20	1820	1840	1885	1915				

SUPPLEMENTARY TABLES FOR SIGMA = 50

RADIOCARBON AGE (BP)	CALIBRATED RANGES (95% CONFIDENCE)							
930	925	975	1010	1235				
920	930	965	1015	1235				
820	1060	1110	1130	1275				
810	1065	1095	1145	1285				
410	1405	1540	1560	1605				
270	1485	1665	1760	1795				
260	1490	1670	1725	1795				
250	1495	1670	1720	1800				
240	1500	1675	1715	1805	1930	1950		
230	1505	1675	1710	1805	1925	1950		
220	1510	1680	1705	1810	1850	1875	1925	1950
210	1515	1810	1845	1880	1920	1950		
200	1525	1570	1605	1815	1840	1885	1915	1950
190	1620	1890	1910	1950				
70	1665	1765	1790	1940				
60	1670	1730	1795	1935				
50	1670	1720	1800	1935				
40	1670	1715	1800	1930				
30	1675	1710	1805	1930				
20	1680	1705	1810	1855	1875	1925		
10	1680	1705	1810	1850	1880	1920		

SUPPLEMENTARY TABLES FOR SIGMA = 100

RADIOCARBON AGE (BP)	CALIBRATED RANGES (95% CONFIDENCE)							
870	920	980	1005	1290				
860	925	970	1010	1305				
850	935	955	1020	1315				
750	1060	1105	1135	1360				
740	1070	1090	1150	1390				
480	1320	1535	1565	1605				
340	1405	1665	1760	1795				
330	1410	1670	1725	1795				
320	1410	1670	1720	1800				
310	1410	1675	1715	1805	1930	1950		
300	1415	1675	1710	1805	1925	1950		
290	1415	1680	1705	1810	1850	1875	1925	1950
280	1420	1810	1845	1880	1920	1950		
270	1420	1815	1840	1885	1915	1950		
260	1425	1890	1910	1950				
130	1530	1565	1610	1950				

SUPPLEMENTARY TABLES FOR SIGMA = 150

RADIOCARBON AGE (BP)	CALIBRATED RANGES (95% CONFIDENCE)							
790	925	975	1010	1400				
780	935	960	1015	1405				
680	1060	1110	1130	1425				
670	1065	1095	1145	1430				
560	1235	1525	1575	1595				
420	1315	1665	1765	1790				
410	1320	1670	1730	1795				
400	1325	1670	1720	1800				
390	1325	1675	1715	1800	1930	1950		
380	1330	1675	1710	1805	1930	1950		
370	1335	1680	1705	1810	1855	1875	1925	1950
360	1335	1680	1705	1810	1850	1880	1920	1950
350	1340	1815	1845	1885	1920	1950		
340	1345	1820	1840	1885	1915	1950		
60	1525	1575	1600	1950				

SUPPLEMENTARY TABLES FOR SIGMA = 200

RADIOCARBON AGE (BP)	CALIBRATED RANGES (95% CONFIDENCE)							
950	655	725	750	1335				
940	660	715	755	1340				
930	670	705	765	1340				
720	920	985	1005	1480				
710	925	970	1010	1485				
700	935	960	1020	1490				
630	1045	1540	1560	1610				
600	1060	1105	1135	1640				
590	1070	1090	1150	1645				
500	1230	1665	1765	1790				
490	1230	1670	1755	1795				
480	1235	1670	1720	1800				
470	1240	1670	1715	1800	1930	1950		
460	1245	1675	1710	1805	1930	1950		
450	1245	1675	1710	1805	1855	1875	1925	1950
440	1250	1680	1705	1810	1850	1880	1920	1950
430	1255	1815	1845	1880	1920	1950		
420	1255	1820	1840	1885	1915	1950		
410	1260	1890	1910	1950				

SUPPLEMENTARY TABLES FOR SIGMA = 300

RADIOCARBON AGE (BP)	CALIBRATED RANGES (95% CONFIDENCE)							
790	660	720	750	1535	1565	1605		
780	665	710	760	1620				
770	675	695	765	1630				
660	885	1665	1770	1790				
650	890	1665	1760	1795				
640	890	1670	1725	1800				
630	895	1670	1720	1800	1930	1950		
620	900	1675	1715	1805	1930	1950		
610	900	1675	1710	1805	1925	1950		
600	905	1680	1705	1810	1850	1875	1925	1950
590	910	1815	1845	1880	1920	1950		
580	915	1815	1840	1885	1915	1950		
570	920	1890	1910	1950				
560	925	980	1005	1950				
550	930	965	1015	1950				
440	1060	1100	1140	1950				