[RADIOCARBON, VOL 32, NO. 1, 1990, P 59-79]

RE-EVALUATION OF BRITISH MUSEUM RADIOCARBON DATES ISSUED BETWEEN 1980 AND 1984

S G E BOWMAN, J C AMBERS and M N LEESE
British Museum Research Laboratory, London WC1B 3DG, England

ABSTRACT. Dates issued by the British Museum radiocarbon laboratory between 1980 and 1984 are known to have been in error. This paper outlines the cause of the problem and the procedures adopted to revise the results affected. Where revision has been possible, on average this has given dates older by 200 to 300 radiocarbon years. The individual revised results are tabulated.

INTRODUCTION

The British Museum radiocarbon laboratory has employed liquid scintillation counting for some years. In the early 1980s, two counters were in operation with a scintillation cocktail comprising 5.5ml of sample benzene and 9.5ml of toluene containing PPO. Each counter was normally operated with only one modern (NBS oxalic) and two background samples. It is now known that from 1980 to 1984, BM ^{14}C results were in error, being too young by amounts that depend on the date of measurement and on the counter used (Tite *et al* 1987, 1988). This paper outlines how the problem was identified and the procedures adopted to try to provide revised results for some 470 archaeological samples; a more detailed report is available from the authors.

IDENTIFICATION OF THE ERROR

When the results of the intercomparison of radiocarbon measurements organized by the Glasgow group were published (International Study Group 1982), the BM results for samples measured in mid-1980 were on average ca 200 yr younger than the consensus data. This contrasted with the findings of an intercomparison organized by Harwell and the British Museum in 1979 in which the BM results were consistent with those of other laboratories (Otlet *et al* 1980).

During 1983 further samples of the wood provided for the Glasgow study were analyzed. The measurements were not conclusively different from the previous results, and the two counters were in agreement; however all data were still different from the Glasgow consensus results. This apparent self-consistency was taken as an indication that the counting system was not the cause of the problem and led to suspicion about the sample pretreatment, since cellulose extraction was not then a routine procedure at the BM. The situation was further clouded by measurements on archaeological samples which apparently gave the correct age or which were in broad agreement, within statistics, with those of other laboratories.

Subsequent more rigorous analysis of all the BM data for the 5-month period, July to November 1980, indicated a slight trend with time of measurement. Counting of the two moderns, one from each counter, in a single counter together with other modern samples, previously synthesized but not then in use for dating, showed an unacceptable range. Counting of archaeological samples ceased at the end of 1984.

Before 1984, the modern samples were kept in the counters for long periods (often several years) and had been infrequently weighed. When weight losses were observed, they were made up either by addition of dead benzene or scintillator solution. No reweighing of background samples or volume adjustments had been made. Given the long residency time of these reference samples in the counters, evaporation losses, particularly of the moderns, seemed the most likely cause of the error.

In addition, no correction was made for the differential loss of benzene relative to toluene in calculating the benzene weights. During the investigation it became apparent that this had a much larger effect than previously thought and hence reweighing of the moderns did not accurately adjust for evaporation losses. The net modern count rate per unit mass of benzene was therefore expected to be in error, even immediately after reweighing. This could not be re-evaluated due to the *ad hoc* addition of either dead benzene or scintillator

solution to make up volume, and moreover, since the screw caps of the vials absorb moisture and must be changed to facilitate reweighing, evaporation losses can be introduced during this process (Otlet & Slade 1974).

THE CURRENT COUNTING SYSTEM

To investigate the scale of the problem, the BM counting system was first upgraded. The measures adopted are summarized in Bowman and Ambers (1989) and were designed to remove biases, to ensure that they do not recur and to obtain a realistic measure of precision (now typically ± 40–50 yr for a full-sized sample equivalent to 5.5ml of benzene). In particular, a sample of accurately and precisely known ^{14}C age is counted quasi-simultaneously with all samples to be dated. The reference samples, kindly supplied by Mike Baillie and Jon Pilcher, are groups of 10 or 20 rings of bog oak dated by Gordon Pearson's high-precision radiocarbon laboratory in Belfast as part of their calibration study. The first four samples, representing three different ages, that were run by the BM differed on average by 14 years from the Belfast results (standard error ± 9).

THE DATA AVAILABLE TO RE-EVALUATE DATES IN ERROR

The problem period was 1980 to 1984, when some 470 archaeological samples were processed. The ideal solution to the problem would have been to redate from scratch all samples measured during this period. Apart from constraints on time available, this was not possible because few of the samples submitted had been sufficiently large for more than the initial measurement. Recounting of the stored sample cocktails was possible but would not have given accurate results because of additional problems due to evaporation and losses during transfer from counting vial to storage vial and back. The feasibility of evaluating correction factors was therefore investigated.

The data available to investigate the problem for each counter were the count rate for the background samples and the quench-corrected net modern count rate per unit weight, where the weight is not accurately known, as discussed above. Even had it been possible to evaluate the true net modern count rate, the counting efficiency of each counter at any given time was not independently known, and hence the error introduced by evaporation of the modern could not have been calculated directly.

There were a few other samples that had been in the counters over some or all of the problem period. For the data from these to be useful, however, they must be for flame-sealed samples. The results are limited and different for the two counters (referred to as PAC1 and PAC2):

PAC1—throughout the period 1980–1984, the ^{14}C age for a sample of unknown age (ref BM-477B);

PAC2—for the period from mid-1980 (earlier data could not be retrieved from the computer), the count rates for a hot sample of unknown activity (ref QS1).

Had these not been available, then no attempt could have been made to revise the results. To these data were added the results of redating ca 30 samples from scratch in the upgraded system. The samples were chosen primarily on the basis of sufficient material remaining, but also so that their initial times of measurement were at ca 4-month intervals through the problem period. These samples, together with those from Glasgow run in 1980 and 1983, give a measure of the discrepancy, δ, in BM results at specific times. Each discrepancy obviously has an associated error term, σ, which is a combination of the error on the old and that on the new results (or, for the Glasgow samples, on the 1980 BM result and the consensus result).

Many of the redated samples were charcoal which, even for a single archaeological context, may represent a substantial age range. In choosing charcoal samples for redating, care was taken to ensure they were not likely to be dominated by material unrepresentative of the bulk sample as described on submission. To determine whether this assumption was justified, two samples were chosen that were sufficiently large to allow several ^{14}C measure-

ments. One was bone, the vertebrae of an ox from Badshot (original ref BM-2273). The other was charcoal from Down Farm (original ref BM-1852) (Table 1). The bone results indicate the variation for replicate samples (which is in line with the estimated errors). Four of the charcoal results were on non-selected material (*ie*, no regard was given to anatomy or species). The reasonable reproducibility for these samples is encouraging and necessary for the correction procedures adopted.

DATA ANALYSIS FOR THE TWO COUNTERS

Since the data available are different for the two counters, the approach was appropriately adapted.

PAC1

Four modern samples were used in PAC1 during the problem period, although only during the latter half of 1984 was there more than one in the counter at the same time. The sealed sample 477B was present throughout. For the period during which the original sample was dated (typically of 3 weeks duration), the correction to be applied has been estimated as the difference between the measured age (m) for the sealed sample (which varied in time) and an estimate of its true value, T, which is unknown, but was estimated from a plot of δ *vs* m for the redated sample. The measured age, m, for a particular week was computed by averaging weekly values in the 3-week period centering on that week. This smoothing process, which was aimed at reflecting basic underlying trends rather than short-term variations, was restarted whenever a sample was reweighed, and after gaps in the record, in order to avoid averaging values obtained under very different conditions. Linear interpolation was applied to find the m value corresponding to the exact date at the mid-point of original measurement period. The correction applied was then given by T-m. Such corrections have a correlation of 0.7 with the discrepancies, δ. This implies that ca 50% of the total variation in the discrepancies can be explained by trends in the measured age of the sealed sample, and that the correction is therefore worthwhile. The remaining 50% is obscure and is reflected in the uncertainty in the final corrections.

PAC2

One modern (ref M29) was in use in this counter during the whole of the problem period, though for part of 1984, a flame-sealed modern (M14) was also present. The usefulness of the data available from QS1 is limited in that QS1, a hot sample giving in the order of 10^4cpm/g, is not sensitive to background evaporation. Thus it can therefore only be used as a monitor of the effect of gain changes on the modern count rate. Despite this major limitation, it was considered worthwhile to determine which trends in the modern count rate could be attributed to evaporation losses and which to gain changes.

Overall, five episodes of change in the quenched corrected count rate for M29 were observed. Surprisingly only one period of evaporation loss, from mid-1984, was identified within errors. On the basis of these data, the mean of 28 δ values was taken to provide a measure of the discrepancy in BM results from PAC2 for the period mid-1980 to mid-1984. Subsequently, two moderns were in use and the results were recalculated using only M14, which was flame-sealed and the count rate for which showed no time dependence. The mean δ value, based on 3 values, was found for this period and used as the correction.

Prior to mid-1980, a time trend in M29 count rate is identifiable. However, since the data for QS1 are not available, there is no independent information on gain changes. A limited number of δ values and the modern count-rate data are insufficient to provide a correction for the 44 dates from PAC2 issued in this period.

ERROR ANALYSIS

The final error term on a correction was a combination of factors: 1) error on the estimate of the true value adopted (T for PAC1 and the appropriate mean δ value for PAC2),

2) residual uncertainty reflected in the variance of the δ values (reduced by the analysis of time trends in the case of PAC1) and 3) underestimation of the original error. Factor 3 was necessary because following upgrading of the system to improve accuracy and evaluate precision more realistically, it became clear that the errors previously quoted would have been underestimates, even if the problem of inaccuracy had not existed. To allow for this, ± 60 yr has been added (in quadrature) to the original quoted error before any addition of the extra uncertainty introduced by the correction procedures. In a few cases, this may be an unduly pessimistic view of the likely errors, eg, when comparing groups of dates measured under the same conditions.

THE RESULTS

Following the analysis, two types of result have been issued: new dates where a sample has been reprocessed from scratch (these are the samples used to provide δ values), and revised results, *ie*, results where a correction has been applied to the initial result and a new error term has been evaluated. These new and revised results are differentiated (from each other as well as from the initial result) by appending N and R, respectively, to the initial BM reference. Table 1 shows the new results and Table 2 the revised results, together with initial results and original *RADIOCARBON* references. Table 3 lists those samples measured in PAC2 for which no revisions have been issued.

DISCUSSION

Before discussing the revised results themselves, the period of the error will be considered. The end point is clear, being when dating ceased at the end of 1984 for investigation and upgrading. The beginning is less clear, but can be inferred. For PAC2, it is taken as the time when the counter began to be used for dating, *ie*, the beginning of 1980. For PAC1, the Harwell/BM intercomparison indicates that there was no problem in mid-1979 and the 3-weekly average dates for BM-477B indicate that there was little, if any, error on dates issued prior to 1980. Coincidentally, therefore, the start of the problem period is the same in the two counters. Prior to 1979, while there is no reason to doubt the results issued, there is no independent check on the data from PAC1.

On average, the revision has given results which are older by 200–300 ^{14}C yr. A few remain effectively unchanged, whereas a few others have changed by 300 yr. It is clearly not possible here to examine so many results from such a large number of varied sites; however, a small number of examples might help to illustrate the general effect of the revised data.

Cranborne Chase, British Isles

The Middle Bronze Age results in particular were problematic, suggesting a late occurrence of the Deverel-Rimbury culture in the Wessex area relative to the rest of the country. The revised results indicate a more unified picture for the country as a whole, and thus that the apparent temporal hiatus was an artifact of the ^{14}C results (Barrett, Bradley & Green, in press).

Peel Castle, British Isles

Two samples came from a cemetery allegedly of a pre-Viking, Celtic monastery of the 8th century AD (Burleigh, Ambers & Matthews 1984:63). One of the graves (BM-2305: 630 ± 45 BP) was overlain by a hearth archaeomagnetically dated to ca AD 1150. Even allowing for the original underestimated error term and a 2σ error range (*ie*, ca ± 150), after calibration (Stuiver & Pearson 1986), this result postdates the hearth. The revised result is 940 ± 120 BP (BM-2305R) which calibrated indicates with 60% probability (Leese 1987) that this grave antedates the hearth.

Burghfield Quarry, British Isles

One sample from this site was counted in both PAC1 and PAC2. The results, BM-2096A and -2096, were 1750 ± 50 BP AND 1500 ± 60 BP, respectively (Burleigh, Ambers &

Matthews 1984:63). Applying the appropriate correction process to each result gives 1840 ± 100 BP (BM-2096AR) and 1720 ± 120 BP (BM-2096R). This sample was also dated from scratch giving 1800 ± 50 BP (BM-2096N). The original results clearly indicate a different discrepancy in the two counters at the time of measurement whereas the revised dates are in reasonable agreement with each other and with the new result.

CONCLUDING REMARKS

Radiocarbon dating, while routine, nevertheless requires vigilance to avoid inclusion of substantial systematic errors. To many laboratories this is obvious, but the British Museum example is not an isolated one as demonstrated by Scott *et al* (in press) and Waterbolk and Lanting (in press) at the second Groningen Archaeology and ^{14}C meeting. Systematic errors can only be dealt with by the laboratory in question on the basis of the results it gains from participation in carefully designed intercomparison experiments such as those of Scott *et al* (in press) or from smaller scale self-checks, such as those described above in relation to the current counting system. Only the laboratory in question can provide the submitter with information on the likelihood of such an error at a given time since the situation is unlikely to be static.

Our recent experience has been a salutary lesson leading to a long overdue upgrading of the counting system and the introduction of continuous self-checking procedures. That this lesson was learned at the expense of loss of primary data from so many samples is, to say the least, highly regrettable. While it has been possible to salvage something for the majority of these samples, this does not wholly compensate, particularly given the loss of precision, and where appropriate, a selective program of dating new material is being considered.

AKNOWLEDGMENTS

We wish to thank Michael Tite, who initiated the investigation of this problem, for helpful advice throughout. We are very grateful to Doug Harkness and Gordon Pearson, who kindly agreed to read a draft of this paper and made constructive comments. We also particularly wish to thank the many submitters of radiocarbon samples for their patience and support during the period of time when results were under revision.

REFERENCES

Ambers, J 1987 Stable carbon isotope ratios and their relevance to the determination of accurate radiocarbon dates for lime mortars. *Jour Archaeol Sci* 14: 569–576.

Ambers, J, Burleigh, R and Matthews, K 1987 British Museum natural radiocarbon measurements XIX. *Radiocarbon* 29 (1): 61–77.

Ambers, J, Matthews, K and Bowman, S 1987 British Museum natural radiocarbon measurements XX. *Radiocarbon* 29 (2): 177–196.

Ambers, J, Matthews, K and Burleigh, R 1985 British Museum natural radiocarbon measurements XVIII. *Radiocarbon* 27 (3): 508–524.

Barrett, J, Bradley, R and Green, M, in press, *Landscape, monuments and society - The prehistory of Cranborne Chase*. Cambridge, Cambridge Univ Press.

Bowman, SGE and Ambers, JC, in press, Past and present: the identification of an error in, and the present status of, radiocarbon dating at the British Museum. *In* Mook, WG and Waterbolk, HT, eds, Internatl symposium, Archaeology and ^{14}C, 2nd, Proc. *PACT*.

Burleigh, R, Ambers, J and Matthews, K 1982 British Museum natural radiocarbon measurements XV. *Radiocarbon* 24 (3): 262–290.

—— 1983 British Museum natural radiocarbon measurements XVI. *Radiocarbon* 25 (1): 39–58.

—— 1984 British Museum natural radiocarbon measurements XVII. *Radiocarbon* 26 (1): 59–74.

Burleigh, R and Matthews, K 1982 British Museum natural radiocarbon measurements XIII. *Radiocarbon* 24 (2): 151–170.

Burleigh, R, Matthews, K and Ambers, J 1982 British Museum natural radiocarbon measurements XIV. *Radiocarbon* 24 (3): 229–261.

Burleigh, R, Matthews, K, Ambers, J and Kinnes, I 1981 British Museum natural radiocarbon measurements XII. *Radiocarbon* 23 (1): 14–23.

International Study Group 1982 An inter-laboratory comparison of radiocarbon measurements in tree rings. *Nature* 298: 619–623.

Leese, MN 1987 Method for finding calendar date bands from multiple-valued radiocarbon calibration curves, *in* Ruggles, CLN and Rahtz, SPQ, eds, Computer and quantitative methods in archaeology. *Br Archaeol Repts, Internatl ser* 393: 147–151.

Otlet, RL and Slade, BS 1974 Harwell radiocarbon measurements I. *Radiocarbon* 16 (2): 178–191.

Otlet, RL, Walker, AJ, Hewson, AD and Burleigh, R 1980 ^{14}C interlaboratory comparison in the UK: experiment design, preparation and preliminary results. *In* Stuiver, M and Kra, RS, Internatl ^{14}C conf, 10th, Proc. *Radiocarbon* 22 (3): 936–946.

Pearson, GW, Pilcher, JR, Baillie, MGL, Corbett DM and Qua, F 1986 High-precision ^{14}C measurements of Irish oaks to show the natural ^{14}C variations from AD 1840–5210 BC. *In* Stuiver, M and Kra, RS, eds, Internatl ^{14}C conf, 12th, Proc. *Radiocarbon* 28 (2B): 911–934.

Scott, EM, Aitchison, TC, Harkness, DD, Baxter, MS and Cook, GT 1989 An interim progress report on stages 1 and 2 of the international collaborative program. *In* Long, A and Kra, RS, eds, Internatl ^{14}C conf, 13th, Proc. *Radiocarbon* 31 (3):414–421.

Scott, EM, Baxter, MS, Harkness, DD, Aitchison, TC and Cook, GT, in press, Recent progress in the international comparison of radiocarbon laboratories. *In* Mook, WG and Waterbolk, HT, eds, Internatl symposium, Archaeology and ^{14}C, 2nd, Proc. *PACT*.

Stuiver, M and Pearson, GW 1986 High-precision calibration of the radiocarbon time scale, AD 1950–500 BC. *In* Stuiver, M and Kra, RS, eds, Internatl ^{14}C conf, 12th, Proc. *Radiocarbon* 28 (2B): 805–838.

Tite, MS, Bowman, SGE, Ambers, JC and Matthews, KJ 1987 Preliminary statement on an error in British Museum radiocarbon dates (BM-1700 to BM-2315). *Antiquity* 61 (232): 168.

—— 1988 Preliminary statement on an error in British Museum radiocarbon dates (BM-1700 to BM-2315). *Radiocarbon* 30 (1): 132.

Waterbolk, HT and Lanting, JN, in press, Empirical evidence for quality differences between radiocarbon laboratories. *In* Mook, WG and Waterbolk, HT, eds, Internatl symposium, Archaeology and ^{14}C, 2nd, Proc. *PACT*.

TABLE 1
Published BM Radiocarbon dates for which new results have been measured

Site	Original BM no.	Original result (yr BP)	New BM no.	New result (yr BP)	Radiocarbon date list (no.-pg no.)
British Isles					
Petters Sports Field	1624	2450 ± 70	1624N	2630 ± 70	XII-p 19
Handley Barrow	1648	2810 ± 60	1648N	3100 ± 50	XII-p 21
Welsh St Donats	1680	3190 ± 35	1680N	3510 ± 50	XII-p 22
Bigberry	1768	1920 ± 35	1768N	2060 ± 50	XIV-p 232
Down Farm*	1852	2740 ± 40	1852N1	3120 ± 50	XV-p 271
			1852N2	3270 ± 50	" "
			1852N3	3100 ± 50	" "
			1852N4	3150 ± 60	" "
			2577	2980 ± 50	" "
	1853	2790 ± 45	1853N	2980 ± 50	" "
Netherton	1899	920 ± 35	1899N	980 ± 70	XVI-p 41
Poundbury	1923	1500 ± 40	1923N	1620 ± 50	XVI-p 43
Street House Farm	1969	4720 ± 50	1969N	4940 ± 60	XVI-p 43
	2007	3220 ± 45	2007N	3470 ± 50	" "
	2061	5070 ± 50	2061N	5080 ± 60	" p 44
Burghfield Quarry	2096	1500 ± 60			XVII-p 63
	2096A	1750 ± 50	2096AN	1800 ± 50	" "
Dorchester	2268	3950 ± 70	4225N	4230 ± 50	XVIII-p 510
Badshot**	2273	4480 ± 100	2273N1	4780 ± 40	XIX-p 63
			2273N2	4710 ± 50	" "
			2273N3	4730 ± 50	" "
Oldbury	2291	1840 ± 40	2291N	2070 ± 50	XIX-p 65
Maumbury Rings	2282	3640 ± 70	2282N	3970 ± 50	XIX-p 64
Egypt					
Tell el-D'aba	1726	3410 ± 60	1726N	3490 ± 50	XV-p 275
France					
Choisy-au-Bac	2058	2310 ± 50	2058N	2560 ± 60	XVII-p 67
	2050	2490 ± 50	2050N	2590 ± 80	" p 66
India					
Zawar	2223	230 ± 60	2223N	530 ± 50	XVIII-p 519

* BM-2577 is a new measurement on selected twiggy material from the same original material as was used for BM-1852. The other four new results on this charcoal sample were not selected in any particular way.
** Three separate samples were prepared and dated from raw material. The mean date and standard error is BM-2273N: 4740 ± 20 BP.

https://doi.org/10.1017/S0033822200039953 Published online by Cambridge University Press

TABLE 1 (Continued)

Site	Original BM no.	Original result (yr BP)	New BM no.	New result (yr BP)	Radiocarbon date list (no.-pg no.)
Jordan					
Jericho	1780	3890 ± 60	1780N	4320 ± 50	XV-P 279
	1791	2040 ± 40	1791N	2360 ± 50	" P 280
Pakistan					
Bhir Mound	1957	2000 ± 45	1957N	2350 ± 50	XVI-p 52
Spain					
Ferrandell Oleza	1842	2430 ± 230	1842N	2850 ± 70	XV-p 282
Syria					
Tell Nebi Mend	2032	2925 ± 45	2032N	3160 ± 70	XVII-p 72
Tell Brak	*		2511	3960 ± 90 (Humic acids)	
			2531	3840 ± 50 (Humins)	
United States					
Indian Fort Road	2121	200 ± 30	2121N	260 ± 50	XVII-p 73

* This sample was from the same context as BM-1971,-1972 and -1973 (XVI-p 57) but is not from exactly the same sample. As part of the pretreatment, it was separated into two component fractions before measurement. Statistically there is no difference in age between the two and therefore no apparent contamination had occurred during burial. The weighted mean of the two results is 3870 ± 50 BP.

TABLE 2a

Published BM Radiocarbon dates for which revised results have been issued

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Algeria					
Cherchel	1909	1760 ± 130	1909R	1990 ± 170	XVI-p 39
	1910	1620 ± 70	1910R	1840 ± 120	" "
	2129	1080 ± 130	2129R	1310 ± 160	XVII-p 59
	2130	460 ± 50	2130R	690 ± 110	" "
	2132	65 ± 40	2132R	290 ± 110	" "
	2133	45 ± 35	2133R	270 ± 110	" "
	2134	modern	2134R	170 ± 110	" "
British Isles					
Holne Moor	1604	6760 ± 240	1604R	6900 ± 260	XII-p 18
	1605	1000 ± 60	1605R	1080 ± 110	" "
	1606	4730 ± 360	1606R	4840 ± 370	" "
	1607	3250 ± 50	1607R	3390 ± 100	" "
	1608	3060 ± 60	1608R	3190 ± 100	" "
	1609	3270 ± 60	1609R	3400 ± 110	" "
	1610	3150 ± 80	1610R	3290 ± 120	" "
	1611	3150 ± 80	1611R	3300 ± 120	" "
	1612	2490 ± 110	1612R	2580 ± 140	" "

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Darent Gravels	1618	980 ± 80	1618R	1060 ± 120	XV-p 262
	1619	9770 ± 80	1619R	9840 ± 120	" "
	1672	115 ± 35	1672R	360 ± 100	" "
	1673	780 ± 60	1673R	1020 ± 110	" p 263
	1674	9760 ± 70	1674R	10,080 ± 120	" "
	1675	150 ± 60	1675R	510 ± 110	" "
Thatcham	1634	8160 ± 560	1634R	8300 ± 570	XV-p 265
	1635	9560 ± 260	1635R	9700 ± 280	" p 266
	1636	9380 ± 80	1636R	9520 ± 120	" "
	1637	9170 ± 140	1637R	9320 ± 170	" "
Dean Bottom	1668	3770 ± 35	1668R	3910 ± 100	XII-p 21
	1669	3580 ± 40	1669R	3750 ± 100	" "
Tolpits Lane	1676	5230 ± 60	1676R	5540 ± 110	XV-p 263
Southwark	1678	1740 ± 35	1678R	1990 ± 100	XV-p 267
Welsh St Donats *	1679	2810 ± 35	1679R	3020 ± 100	XII-p 22
	1681	3250 ± 35	1681R	3470 ± 100	" "
Lingey Fen	1707	4630 ± 50	1707R	4860 ± 110	XV-p 267
	1708	6370 ± 70	1708R	6600 ± 120	" "
	1709	2050 ± 50	1709R	2280 ± 110	" p 268
	1711A	2620 ± 40	1711AR	2850 ± 110	" "
Lingey Fen	1711B	2560 ± 45	1711BR	2780 ± 110	XV-p 268
Kildale	1725	8270 ± 80	1725R	8490 ± 120	XVI-p 40
Feltwell	1735	11,560 ± 110	1735R	11,600 ± 140	XV-p 263
Caerwys	1736	7880 ± 160	1736R	8100 ± 180	XV-p 268
Binnel Point	1737	4480 ± 100	1737R	4700 ± 140	XV-p 268
Millpark	1738	3190 ± 170	1738R	3420 ± 200	XV-p 268
Ballybetagh	1794	15,170 ± 160	1794R	15,330 ± 180	XV-p 263
Castlethorpe	1795	3410 ± 80	1795R	3500 ± 120	XV-p 269
Freshwater Shells	1798	860 ± 40	1798R	5130 ± 100	XV-p 269
	1799	4340 ± 45	1799R	4490 ± 100	" "
	1800	4140 ± 50	1800R	4460 ± 100	" "
	2135	1480 ± 50	2135R	1780 ± 100	XVII-p 60
	2136	730 ± 180	2136R	1040 ± 200	" "
Creswell Crags	1805	38,850 ± 2500	1805R	infinite	XV-p 264
Thor's Fissure	1807	20,100 ± 1900	1807R	20,400 ± 1900	XVI-p 40

* Material from sites marked with an asterisk has also been redated from scratch. See Table 1 for new results.

https://doi.org/10.1017/S0033822200039953 Published online by Cambridge University Press

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Swildon's Hole	1808	1730 ± 60	1808R	1960 ± 120	XV-p 270
Foel Fawr	1809	5240 ± 80	1809R	5470 ± 130	XV-p 270
	1810	5210 ± 130	1810R	5440 ± 160	" "
	1903	5100 ± 360	1903R	5330 ± 370	" "
Peninsular	1824	150 ± 40	1824R	370 ± 110	XV-p 270
House	1825	230 ± 35	1825R	460 ± 110	" "
Lough Gur	1827	4020 ± 90	1827R	4250 ± 140	XV-p 264
Rodney Stoke	1837	7940 ± 180	1837R	8170 ± 200	XV-p 269
Seamer Carr	1841	8620 ± 80	1841R	8740 ± 120	XV-p 264
Down Farm*	1850	2680 ± 130	1850R	2900 ± 160	XV-p 271
	1851	2730 ± 50	1851R	2950 ± 110	" "
	1854	2800 ± 45	1854R	3030 ± 110	" "
Vazon	1858	3190 ± 210	1858R	3340 ± 230	XV-p 271
	1859	4000 ± 50	1859R	4150 ± 100	" "
Les	1891	3850 ± 50	1891R	4020 ± 100	XV-p 272
Fouaillages	1892	5590 ± 50	1892R	5850 ± 100	" "
	1893	5510 ± 60	1893R	5900 ± 110	" "
	1894	5280 ± 140	1894R	5670 ± 170	" "
	1895	4000 ± 60	1895R	4180 ± 110	" "
	1896	5090 ± 50	1896R	5270 ± 100	" "
	1897	3820 ± 50	1897R	4000 ± 100	" "
Netherton*	1900	1000 ± 100	1900R	1080 ± 140	XVI-p 41
	1901	1000 ± 80	1901R	1330 ± 120	" "
	1902	720 ± 50	1902R	1100 ± 100	" "
	2006	710 ± 80	2006R	1000 ± 120	" "
Megaceros	1904	11,380 ± 280	1904R	11,720 ± 290	XV-p 264
Maldon	1905	150 ± 50	1905R	300 ± 100	XVI- p 41
South Lodge	1917	2790 ± 70	1917R	3010 ± 120	XVI-p 42
Camp	1918	2680 ± 110	1918R	2900 ± 150	" "
	1919	2910 ± 60	1919R	3140 ± 120	" "
	1920	2660 ± 60	1920R	2890 ± 120	" "
	1921	3020 ± 60	1921R	3240 ± 120	" "
	1922	2890 ± 50	1922R	3110 ± 110	" "
	2023	2680 ± 50	2023R	2900 ± 110	" "
	2024	2730 ± 70	2024R	2960 ± 120	" "
Street House	1966	4720 ± 60	1966R	4940 ± 110	XVI-p 43
Farm*	1967	4620 ± 60	1967R	4940 ± 110	" "
	1968	4690 ± 60	1968R	4970 ± 110	" "
	2008	2485 ± 45	2008R	2890 ± 100	" "
	2009	3360 ± 50	2009R	3670 ± 100	" "
	2010	3170 ± 45	2010R	3460 ± 100	" p 44
	2011	4630 ± 80	2011R	4960 ± 120	" "
	2012	4610 ± 80	2012R	4960 ± 120	" "
	2013	4510 ± 90	2013R	4840 ± 130	" "
	2014	4630 ± 70	2014R	4970 ± 120	" "
	2060	4500 ± 130	2060R	4480 ± 160	" "

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Ascott-	1974	4430 ± 130	1974R	4680 ± 160	XVI-p 45
under-	1975	3480 ± 50	1975R	3870 ± 100	" "
Wychwood	1976	4535 ± 40	1976R	4930 ± 100	" "
Gugh	1980	modern	1980R	20 ± 100	XVI-p 40
Vale Castle	2018	845 ± 40	2018R	1110 ± 100	XVI-p 45
Jerbourg	2019	1300 ± 500	2019R	1620 ± 510	XVI-p 45
Northampton	2026	3400 ± 50	2026R	3780 ± 100	XVII-p 61
	2027	5230 ± 45	2027R	5630 ± 100	" "
	2074	23,880 ± 770	2074R	23,750 ± 780	" "
	2074C	25,500 ± 630	2074CR	25,810 ± 640	" "
Canterbury	2044	820 ± 150	2044R	1230 ± 180	XVI-p 45
Brixworth	2047	790 ± 70	2047R	680 ± 120	XVII-p 62
	2047A	740 ± 70	2047AR	670 ± 120	" "
	2048	950 ± 50	2048R	860 ± 100	" "
	2049	710 ± 220	2049R	700 ± 240	JAS
Brixworth	2066	1510 ± 90	2066R	1420 ± 130	"
Mortars	2078	710 ± 120	2078R	680 ± 150	"
	2079	1180 ± 190	2079R	1200 ± 210	"
	2080	770 ± 100	2080R	830 ± 140	"
	2141	660 ± 260	2141R	980 ± 280	"
	2151	910 ± 150	2151R	1130 ± 120	"
Brixworth	2152	1330 ± 50	2152R	1560 ± 110	JAS
Mortars	2153	1690 ± 150	2153R	1920 ± 180	"
	2154	900 ± 150	2154R	1130 ± 180	XVII-p 62
	2155	890 ± 100	2155R	1110 ± 140	" "
Harrow Hill	2071	4670 ± 60	2071R	4900 ± 120	XVII-p 62
	2075	4790 ± 50	2175R	5020 ± 110	" "
	2097	4910 ± 110	2097R	5140 ± 150	" "
	2098	5120 ± 120	2098R	5350 ± 150	" "
	2099	4820 ± 70	2099R	5040 ± 120	" "
	2124	4800 ± 170	2124R	5060 ± 190	" "
Unio	2072	1525 ± 30	2072R	1470 ± 100	XVII-p 60
Tumidus	2073	750 ± 180	2073R	700 ± 200	" "
Witton	2088	3090 ± 60	2088R	3320 ± 120	XVII-p 63
Haddenham	2091	1760 ± 70	2091R	1990 ± 120	XVII-p 63
Bridged Pot	2102	8890 ± 340	2102R	9090 ± 350	XVII-p 65
Picken's Hole	2117	27,540 ±2440	2117R	27,770 ±2440	XVII-p 65
	2118	12,400 ±1500	2118R	12,710 ±1500	" "
Flag Fen	2123	2610 ± 60	2123R	2830 ± 120	XVII-p 63
Ossom's Cave	2126	25,300 ±1500	2126R	25,610 ±1500	XVII-p 65
	2127	11,930 ± 310	2127R	12,220 ± 320	" "
	2128	4810 ± 420	2128R	5120 ± 430	

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Devil's Dyke	2137	2315 ± 35	2137R	2580 ± 100	XVII-p 64
Devizes Castle	2150	525 ± 30	2150R	750 ± 100	XVII-p 64
Stonea	2157	1950 ± 50	2157R	2170 ± 110	XVIII-p 508
Ozengell	2158	modern	2158R	130 ± 100	XVIII-p 508
Dorchester	2161	3840 ± 40	2161R	4060 ± 110	XVIII-p 509
Cursus*	2162	3870 ± 60	2162R	4100 ± 120	" "
	2163	3780 ± 50	2163R	4070 ± 130	" "
	2164	3890 ± 60	2164R	4120 ± 120	" "
	2165	3330 ± 80	2165R	3550 ± 130	" p 510
	2166	3730 ± 45	2166R	4030 ± 130	" "
	2167	3390 ± 70	2167R	3690 ± 130	" "
Kent's Cavern	2168	11,570 ± 410	2168R	11,800 ± 420	XVIII-p 510
Down Farm	2177	3050 ± 70	2177R	3270 ± 120	XVIII-p 511
Ring Ditch	2178	3010 ± 60	2178R	3240 ± 120	" "
	2179	2740 ± 30	2179R	2960 ± 100	" "
	2180	2810 ± 50	2180R	3030 ± 110	" "
Pitstone	2181	5520 ± 60	2181R	5750 ± 110	XVIII-p 511
Gough's	2183	12,120 ± 120	2183R	12,350 ± 160	XVIII-p 512
Cave	2184	12,020 ± 120	2184R	12,250 ± 160	" "
	2185	11,970 ± 230	2185R	12,200 ± 250	" "
	2186	12,240 ± 220	2186R	12,470 ± 240	" "
	2187	12,070 ± 170	2187R	12,300 ± 200	" "
	2188	12,160 ± 210	2188R	12,380 ± 230	" "
Down Farm	2189	3390 ± 45	2189R	3620 ± 110	XIX-p 62
Pond Barrow	2190	3210 ± 45	2190R	3500 ± 130	" "
	2191	3670 ± 60	2191R	3900 ± 120	" "
	2192	3110 ± 100	2192R	3390 ± 150	" "
	2324	3190 ± 70	2324R	3490 ± 130	" "
Whitton	2203	4820 ± 80	2203R	5040 ± 130	XVIII-p 513
Hill	2204	2860 ± 90	2204R	3080 ± 140	" "
	2205	3610 ± 45	2205R	3830 ± 110	" "
	2206	3740 ± 50	2206R	3970 ± 110	" "
	2264	2880 ± 310	2264R	3190 ± 330	" "
	2265	3680 ± 80	2265R	3980 ± 130	" "
	2266	3660 ± 50	2266R	3960 ± 130	" "
	2267	2770 ± 170	2267R	3030 ± 210	" "
Roxby	2207A	1950 ± 150	2207AR	2180 ± 180	XIX-p 61
	2208A	7090 ± 120	2208AR	7310 ± 150	" "
Rangoon Street	2214	1050 ± 45	2214R	1270 ± 110	XVIII-p 514
	2215	980 ± 50	2215R	1210 ± 110	" "
Asham	2216	2760 ± 120	2216R	2990 ± 150	XVIII-p 514
Quarry	2217	3460 ± 190	2217R	3680 ± 210	" "
	2277	3580 ± 280	2277R	3740 ± 290	" "
	2296	4590 ± 110	2296R	4720 ± 130	" p 515

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
S Heighton	2219	3450 ± 150	2219R	3620 ± 160	XVIII-p 515
Cow Gap	2220	4820 ± 350	2220R	5000 ± 360	XVIII-p 515
	2295	5860 ± 130	2295R	6080 ± 150	" "
Ferriters Cove	2227	5230 ± 200	2227R	5400 ± 220	XVIII-p 517
	2228	5580 ± 110	2228R	5750 ± 140	" "
	2229	5310 ± 130	2229R	5490 ± 160	" p 518
	2227A	5190 ± 110	2227AR	5420 ± 150	" p 517
	2228A	5620 ± 80	2228AR	5850 ± 130	" "
	2229A	5270 ± 90	2229AR	5500 ± 130	" p 518
Gallibury Down	2230	3560 ± 50	2230R	3740 ± 100	XVIII-p 516
	2231	5150 ± 60	2231R	5330 ± 110	" "
	2232	3380 ± 80	2232R	3560 ± 120	" "
	2233	3440 ± 150	2233R	3610 ± 180	" "
	2234	3520 ± 90	2234R	3700 ± 130	" "
Garden Hill	2236	1870 ± 80	2236R	2040 ± 100	to be
	2238	1590 ± 80	2238R	1840 ± 100	
	2239	1940 ± 90	2239R	2090 ± 110	published
	2241	2370 ± 45	2241R	2520 ± 80	
Soldier's Hole	2249	9930 ± 210	2249R	10,090 ± 230	XVIII-p 517
Mt Gabriel	2271	3200 ± 110	2271R	3410 ± 140	XIX-p 66
Badshot*	2272	4420 ± 90	2272R	4640 ± 130	XIX-p 63
	2274	4600 ± 120	2274R	4860 ± 180	" "
Maumbury Rings*	2281	3650 ± 70	2281R	3940 ± 130	XIX-p 64
Wor Barrow	2283	4350 ± 70	2283R	4660 ± 130	XIX-p 64
	2284	4440 ± 70	2284R	4740 ± 130	" "
Oldbury*	2290	2310 ± 50	2290R	2610 ± 130	XIX-p 64
	2292	1910 ± 80	2292R	2210 ± 140	" p 65
Peel Castle	2303	170 ± 50	2303R	480 ± 140	XIX-p 66
	2304	150 ± 40	2304R	440 ± 140	" "
	2305	630 ± 45	2305R	940 ± 120	" "
	2306	730 ± 50	2306R	1050 ± 120	" "
Springfield	2313	2780 ± 90	2313R	3090 ± 150	XIX-p 65
	2314	2370 ± 80	2314R	2670 ± 140	" "
Strichen	2315	2150 ± 60	2315R	2460 ± 130	XIX-p 67
	2316	3090 ± 60	2316R	3390 ± 130	" "
	2317	2050 ± 80	2317R	2370 ± 130	" "
Turnford Lane	2331	2650 ± 90	2331R	2960 ± 150	XX-p 179

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Canada					
Canadian	1751	115 ± 40	1751R	210 ± 100	XV-p 273
Arctic	1753	360 ± 25	1753R	560 ± 100	" "
	1754	1135 ± 40	1754R	1150 ± 100	" "
	1766	155 ± 40	1766R	380 ± 110	" "
	1767	85 ± 40	1767R	310 ± 110	" "
	1803	870 ± 30	1803R	1160 ± 100	" "
	1804	800 ± 30	1804R	1100 ± 100	" "
Crete					
Platyvola	1813	4030 ± 50	1813R	4020 ± 100	XV-p 274
Cave	1814	3800 ± 50	1814R	4070 ± 100	" "
	1815	1040 ± 50	1815R	1320 ± 100	" "
	1816	3800 ± 40	1816R	4090 ± 100	" "
	1826	4110 ± 50	1826R	4120 ± 100	" "
Cyprus					
Kalavasos-	1832	4810 ± 45	1832R	5040 ± 110	XV-p 274
Ayious	1833	4780 ± 140	1833R	5000 ± 170	" "
	1834	4800 ± 70	1834R	5030 ± 120	" "
	1835	10,790 ± 80	1835R	11,020 ± 130	" "
	1836	4480 ± 290	1836R	4700 ± 310	" p 275
Ayios	1906	5030 ± 80	1906R	5360 ± 120	XVI-p 46
Epiktitos	1907	5120 ± 45	1907R	5290 ± 100	" "
Vrysi	1908	5180 ± 60	1908R	5360 ± 110	" "
Lemba	2278	3930 ± 100	2278R	4090 ± 120	XIX-p 67
Lakkous	2280	5710 ± 100	2280R	5890 ± 120	" "
Kissonerga Mosphilia	2279	4030 ± 110	2279R	4180 ± 130	XIX-p 67
Greece					
Kyrenia	1639	2630 ± 45	1639R	2780 ± 100	XIV-p 239
Ship	2294	2090 ± 50	2294R	2390 ± 120	XIX-p 68
Servia	1885	6360 ± 190	1885R	6590 ± 210	XV-p 277
	1886	4040 ± 50	1886R	4270 ± 110	" "
	1887	6420 ± 120	1887R	6640 ± 150	" p 278
	1888	3560 ± 70	1888R	3790 ± 120	" "
Agios	2020	6400 ± 80	2020R	6740 ± 120	XVI-p 48
Petros	2021	5510 ± 390	2021R	5860 ± 400	" "
Ecuador					
Hacienda	1682	1820 ± 70	1682R	2040 ± 120	XVIII-p 518
Guarumal	1684	1760 ± 70	1684R	2020 ± 130	" "
Egypt					
Deir-el	1796	3490 ± 40	1796R	3720 ± 110	XV-p 276
-Bahri	1796A	3520 ± 60	1796AR	3740 ± 120	" "
	1797	3310 ± 60	1797R	3540 ± 120	" "
Manchester mummy no.1770	1839	1860 ± 120	1839R	2080 ± 160	XV-p 275

https://doi.org/10.1017/S0033822200039953 Published online by Cambridge University Press

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Gawasis	1844	3230 ± 45	1844R	3310 ± 100	XV-p 276
	1845	3555 ± 40	1845R	3650 ± 100	" "
	1846	3180 ± 140	1846R	3080 ± 160	XVI-p 46
Bristol mummy	1872	2880 ± 140	1872R	3020 ± 170	XV-p 277
Tell el Ajjul	2114	8150 ± 300	2114R	8350 ± 310	XVII-p 69
France					
Arcy	1817	26,410 ± 440	1817R	26,690 ± 450	XV-p 277
	1818	10,500 ± 190	1818R	10,570 ± 210	" "
	1819	22,550 ± 350	1819R	22,600 ± 360	" "
Figure of Christ	1977	440 ± 60	1977R	420 ± 120	XVI-p 48
	1978	830 ± 100	1978R	840 ± 140	" "
	1979	830 ± 120	1979R	840 ± 150	" "
	2100	490 ± 100	2100R	400 ± 140	XVII-p 67
	2101	340 ± 100	2101R	540 ± 140	" "
Montgaudier	1911	11,450 ± 70	1911R	11,680 ± 120	XVI-p 47
	1912	12,180 ± 130	1912R	12,410 ± 160	" "
	1913	18,050 ± 230	1913R	18,280 ± 250	" "
	1914	18,180 ±1070	1914R	18,410 ±1070	" "
	1916	13,320 ± 360	1916R	13,550 ± 370	" "
	2309	14,770 ± 270	2309R	14,940 ± 280	XIX-p 69
	2311	20,870 ± 370	2311R	21,050 ± 380	" "
Choisy-au-Bac*	2051	2480 ± 70	2051R	2710 ± 120	XVII-p 66
	2052	2130 ± 130	2052R	2360 ± 160	" "
	2053	1710 ± 360	2053R	1930 ± 380	" "
	2054	2220 ± 140	2054R	2440 ± 170	" "
	2055	2370 ± 60	2055R	2590 ± 120	" "
	2056	2300 ± 110	2056R	2530 ± 150	" "
	2057	2235 ± 40	2057R	2460 ± 110	" "
Les Eyzies	2285	11,600 ± 380	2285R	11,780 ± 390	XIX-p 68
	2286	12,590 ± 980	2286R	12,810 ± 990	" p 69
Hungary					
Hungary	1860	6080 ± 60	1860R	6220 ± 110	XVI-p 48
	1861	5630 ± 140	1861R	5760 ± 170	" "
	1862	6580 ± 60	1862R	6710 ± 110	" "
	1863	6840 ± 110	1863R	6950 ± 140	" p 49
	1864	6090 ± 60	1864R	6180 ± 110	" "
	1865	6190 ± 140	1865R	6400 ± 170	" "
	1866	6620 ± 60	1866R	6780 ± 110	" "
	1867	5730 ± 90	1867R	5950 ± 130	" "
	1868	6830 ± 60	1868R	6970 ± 110	" "
	1870	6600 ± 80	1870R	6950 ± 120	" "
	1871	6470 ± 70	1871R	6830 ± 120	" "
India					
Zawar*	2017	modern	2017R	110 ± 260	XVII-p 67
	2065	modern	2065R	modern	" "
	2148	2120 ± 60	2148R	2350 ± 120	" "
	2149	1920 ± 50	2149R	2140 ± 110	" p 68
	2222	10 ± 40	2222R	240 ± 110	XVIII-p 519
	2243	80 ± 60	2243R	350 ± 130	" "

https://doi.org/10.1017/S0033822200039953 Published online by Cambridge University Press

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Indian Ocean					
Tortoise	2125	750 ± 370	2125R	920 ± 380	XVII-p 68
Iraq					
Nimrud	1856	2300 ± 50	1856R	2530 ± 110	XV-p 278
Tell Taya	2109	3370 ± 45	2109R	3600 ± 110	XVII-p 68
	2110	3650 ± 40	2110R	3870 ± 110	" "
	2112	3640 ± 40	2112R	3870 ± 110	" "
	2113	3110 ± 200	2113R	3340 ± 220	" "
Khirbet Khatuniyeh	2293	2310 ± 80	2293R	2610 ± 140	XIX-p 70
Tell Abu Salabikh	2328	3700 ± 60	2328R	4010 ± 130	XIX-p 70
Israel					
Timna	2242	1210 ± 100	2242R	1400 ± 140	XVIII-p 519
Nahal Hemar	2298	8250 ± 70	2298R	8430 ± 100	XIX-p 71
	2299	9110 ± 300	2299R	9290 ± 310	" "
	2300	8690 ± 90	2300R	8830 ± 110	XIX-p 71
Italy					
Marcianese	2250	6290 ± 60	2250R	6590 ± 130	XIX-p 72
	2251	6250 ± 90	2251R	6570 ± 140	" "
	2252	6000 ± 110	2252R	6300 ± 170	" "
Cala Scizzo	2253	4880 ± 210	2253R	5200 ± 250	XIX-p 72
	2254	4230 ± 100	2254R	4540 ± 150	" "
	2255	3190 ± 80	2255R	3500 ± 130	" "
Santa Barbara	2256	5800 ± 120	2256R	6120 ± 170	XIX-p 73
	2257	5620 ± 130	2257R	5920 ± 170	" "
	2258	5720 ± 120	2258R	6020 ± 160	" "
Cala Colombo	2259	4070 ± 60	2259R	4370 ± 130	XIX-p 73
	2260	4870 ± 90	2260R	5180 ± 140	" "
	2301	1180 ± 50	2301R	1490 ± 130	" p 74
	2302	4810 ± 180	2302R	5080 ± 250	" "
Jordan					
Jericho*	1769	8700 ± 110	1769R	8930 ± 150	XV-p 279
	1770	8680 ± 70	1770R	8910 ± 120	" "
	1771	8660 ± 260	1771R	8890 ± 280	" "
	1772	8810 ± 100	1772R	9040 ± 140	" "
	1773	8730 ± 80	1773R	8960 ± 130	" "
	1774	4380 ± 50	1774R	4600 ± 110	" "
	1775	4480 ± 50	1775R	4710 ± 110	" "
	1778	4080 ± 70	1778R	4300 ± 120	" "
	1779	4160 ± 80	1779R	4390 ± 130	" "
	1781	4120 ± 40	1781R	4350 ± 110	" p 280
	1782	3560 ± 40	1782R	3780 ± 110	" "
	1783	3940 ± 80	1783R	4170 ± 130	" "
	1784	3620 ± 40	1784R	3840 ± 110	" "
	1787	9280 ± 100	1787R	9510 ± 140	" "
	1789	9200 ± 70	1789R	9420 ± 120	" "
	1790	3080 ± 40	1790R	3300 ± 110	" "
	1793	8660 ± 130	1793R	8890 ± 170	" "

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Norway					
Grasvatn	1880	6460 ± 60	1880R	6680 ± 120	XV-p 280
Nigeria					
Igbo-Ukwu	2142	720 ± 360	2142R	940 ± 370	XVIII-p 520
	2143A	1030 ± 300	2143AR	1260 ± 310	" "
	2143B	880 ± 240	2143BR	1100 ± 260	" "
Pakistan					
Sarai Khola	1934	4250 ± 110	1934R	4470 ± 150	XVI-p 50
	1935	4140 ± 230	1935R	4370 ± 250	" "
	1936	3890 ± 230	1936R	4120 ± 250	" "
	1938	3810 ± 60	1938R	4030 ± 120	" "
	1939	4310 ± 120	1939R	4530 ± 160	" "
	1940	4380 ± 170	1940R	4600 ± 200	" "
	1942	3910 ± 70	1942R	4130 ± 120	" "
	1943	3700 ± 60	1943R	3920 ± 120	" p 51
	1944	4040 ± 200	1944R	4270 ± 220	" "
	1945	3790 ± 60	1945R	4020 ± 120	XVI-p 51
	1946	3700 ± 80	1946R	3920 ± 130	" "
	1947	870 ± 50	1947R	1090 ± 110	" "
Islam Chauki	1941	3690 ± 450	1941R	3910 ± 460	XVI-p 51
Hathial West	1948	3600 ± 60	1948R	3820 ± 120	XVI-p 51
	1949	3750 ± 100	1949R	3980 ± 140	" "
	2196	1890 ± 60	2196R	2120 ± 120	XVIII-p 521
	2197	1890 ± 50	2197R	2120 ± 110	" "
	2198	2610 ± 120	2198R	2840 ± 150	" "
	2199	2210 ± 70	2199R	2430 ± 120	" "
Hathial North	1950	1740 ± 40	1950R	1970 ± 110	XVI-p 51
Bhir Mound*	1951	1990 ± 60	1951R	2210 ± 120	XVI-p 52
	1952	1920 ± 170	1952R	2150 ± 200	" "
	1953	1930 ± 50	1953R	2160 ± 110	" "
	1954	1830 ± 40	1954R	2060 ± 110	" "
	1955	2050 ± 60	1955R	2280 ± 120	" "
	1956	1795 ± 35	1956R	2020 ± 110	" "
	1958	2010 ± 40	1958R	2240 ± 110	" "
	1959	1950 ± 50	1959R	2180 ± 110	" "
	1960	1805 ± 35	1960R	2030 ± 110	" "
	1961	2050 ± 80	1961R	2280 ± 130	" "
	1963	2120 ± 200	1963R	2340 ± 220	" "
	1964	2080 ± 80	1964R	2310 ± 130	" "
	1965	2090 ± 90	1965R	2320 ± 130	XVI-p 52
	2195	2140 ± 130	2195R	2370 ± 160	XVIII-p 520
Rehman Dheri	2062	3730 ± 50	2062R	3960 ± 110	XVI p 53
	2063	3580 ± 110	2063R	3810 ± 150	" "
Jhang	2200	3780 ± 220	2200R	4010 ± 250	XVIII-p 521
	2201	4030 ± 50	2201R	4260 ± 110	" "
	2202	940 ± 30	2202R	1170 ± 100	" p 522
Papua New Guinea					
Padad Kao	2093	modern	2093R	30 ± 150	XVII-p 69
	2094	modern	2094R	modern	" "
	2138	modern	2138R	modern	" "

https://doi.org/10.1017/S0033822200039953 Published online by Cambridge University Press

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Peru					
Cusichaca	1633	2380 ± 70	1633R	2530 ± 120	XVI-p 54
Poland					
Wierzbica	2103	2480 ± 100	2103R	2720 ± 140	XVII-p 70
	2104	2460 ± 140	2104R	2590 ± 170	" "
	2105	2230 ± 200	2105R	2470 ± 220	" "
	2107	2380 ± 130	2107R	2700 ± 160	" "
Portugal					
Segovia	2159	2280 ± 45	2159R	2510 ± 110	XIX-p 74
	2160	2410 ± 50	2160R	2640 ± 110	" "
	2287	2140 ± 130	2287R	2460 ± 180	" p 75
	2288	1220 ± 110	2288R	1520 ± 170	" "
	2289	890 ± 60	2289R	1190 ± 130	" "
Sardinia					
Grotta Filiestru	2139	7530 ± 80	2139R	7760 ± 130	XVII-p 70
Spain					
La Riera	1739	20,880 ± 410	1739R	21,100 ± 420	XV-p 283
Ferrandell	1843	3950 ± 60	1843R	4030 ± 110	XV-p 282
Oleza*	1981	3720 ± 35	1981R	3640 ± 100	XVI-p 55
	1982	1710 ± 60	1982R	2050 ± 110	" "
	1988	3150 ± 300	1988R	3350 ± 310	XVII-p 70
	2297	2140 ± 80	2297R	2280 ± 120	XIX-p 75
	2312	3210 ± 80	2312R	3390 ± 100	" "
Cueva de los	1875	10,330 ± 190	1875R	10,480 ± 210	XV-p 283
Azules	1876	10,700 ± 190	1876R	10,880 ± 210	" "
	1877	11,190 ± 350	1877R	11,320 ± 360	" "
	1878	10,720 ± 280	1878R	10,910 ± 290	" "
	1879	10,400 ± 90	1879R	10,510 ± 130	" "
Hornos de la	1881	18,230 ± 510	1881R	18,450 ± 520	XV-p 284
Peña	1882	19,950 ± 300	1882R	20,180 ± 310	" "
	1883	20,700 ± 350	1883R	20,930 ± 370	" "
	1884	24,120 ± 460	1884R	24,340 ± 470	" "
Moncin	1924	2960 ± 40	1924R	3210 ± 100	XVI-p 54
	1925	3020 ± 45	1925R	3290 ± 100	" "
	1926	2880 ± 35	1926R	3260 ± 100	" "
	1927	3040 ± 45	1927R	3470 ± 100	" "
	1928	2915 ± 45	1928R	3340 ± 100	" "
	2193	2860 ± 60	2193R	3080 ± 120	XVIII-p 522
	2194	2840 ± 70	2194R	3060 ± 120	" "
Muertos	1993	855 ± 35	1993R	1240 ± 100	XVI-p 55
Gallard	1994	4760 ± 50	1994R	5160 ± 100	" "
Son Matge	1995	3380 ± 50	1995R	3770 ± 100	XVI-p 55
Son Puig-Servera	1998	2645 ± 40	1998R	2990 ± 100	XVI-p 55
Olive Wood	2001	175 ± 30	2001R	30 ± 100	XVII-p 71
	2002	modern	2002R	230 ± 110	XVIII-p 522

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Torralba d'en Salort	2003	2090 ± 50	2003R	2360 ± 100	XVI-p 56
	2004	1890 ± 35	2004R	2180 ± 100	" "
	2005	1560 ± 80	2005R	1960 ± 120	" "
Chinflon	2064	2440 ± 50	2064R	2350 ± 100	XVII-p 71
Son Matge Mortar	2140	2820 ± 40	2140R	3040 ± 110	XVII-p 71
Rio Tinto	2337	2330 ± 80	2337R	2650 ± 140	XIX-p 75
Syria					
Tell Abu Hureyra	1718	11,160 ± 110	1718R	11,140 ± 140	XV-p 284
	1719	9120 ± 50	1719R	9100 ± 100	" "
	1720	21,940 ± 180	1720R	22,020 ± 200	" "
	1721	8410 ± 60	1721R	8490 ± 110	" "
	1722	8610 ± 50	1722R	8640 ± 100	" "
	1723	10,700 ± 500	1723R	10,820 ± 510	" "
	1724	7900 ± 50	1724R	8020 ± 100	" p 285
Tell Brak*	1758	3680 ± 50	1758R	3720 ± 100	XV-p 285
	1759	3710 ± 60	1759R	3770 ± 110	" "
	1760	4060 ± 50	1760R	4240 ± 100	" "
	1761	4040 ± 70	1761R	4210 ± 120	" "
	1763	3570 ± 40	1763R	3730 ± 100	" "
	1764	3600 ± 40	1764R	3710 ± 100	" "
	1765	3540 ± 40	1765R	3680 ± 100	" "
	1970	3440 ± 50	1970R	3820 ± 100	XVI-p 57
Tell Abada	1822	31,000 ±1250	1822R	31,250 ±1250	XV-p 278
	1823	5770 ± 45	1823R	5920 ± 100	" "
Tell Nebi Mend*	2029	3310 ± 35	2029R	3540 ± 110	XVII-p 72
	2030	2700 ± 40	2030R	2930 ± 110	" "
	2033	2200 ± 50	2033R	2430 ± 110	" "
	2034	2415 ± 40	2034R	2640 ± 110	" "
	2035	3000 ± 35	2035R	3230 ± 110	" "
	2036	4220 ± 120	2036R	4440 ± 160	" "
	2037	2720 ± 230	2037R	2940 ± 250	" "
	2038	2390 ± 45	2038R	2620 ± 110	" "
	2039	4180 ± 90	2039R	4400 ± 130	" "
	2040	3140 ± 60	2040R	3370 ± 120	" "
Thailand					
Ban Don Ta Phet	2016	1810 ± 210	2016R	2190 ± 230	XVI-p 57
Turkey					
Can Hasan	1655	7660 ± 70	1655R	7980 ± 120	XV-p 286
	1656	7770 ± 100	1656R	8090 ± 170	" "
	1657	7760 ± 90	1657R	8080 ± 130	" "
	1658	7760 ± 90	1658R	8060 ± 130	" "
	1660	7990 ± 110	1660R	8390 ± 140	" "
	1662	8050 ± 60	1662R	8460 ± 110	" "
	1663	7940 ± 190	1663R	8350 ± 210	" "
	1664	8120 ± 110	1664R	8470 ± 140	" "
	1665	7990 ± 130	1665R	8270 ± 160	" "
	1666	8160 ± 110	1666R	8460 ± 150	" "
	1667	8360 ± 60	1667R	8480 ± 110	" "

https://doi.org/10.1017/S0033822200039953 Published online by Cambridge University Press

TABLE 2a (Continued)

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
United States					
Indian Fort	2120	80 ± 35	2120R	310 ± 110	XVII-p 73
Road*	2122	125 ± 40	2122R	350 ± 110	" "
United Arab Emirates					
Ghanadha	2261	2470 ± 100	2261R	2650 ± 120	XX-p 195
Yugoslavia					
Trnjane-Staro	1500	385 ± 50	1500R	610 ± 100	XIV-p 254
Groblje	1501	950 ± 50	1501R	1070 ± 100	" "
	1502	585 ± 40	1502R	790 ± 100	" "
Trgoviste	1503	190 ± 45	1503R	420 ± 100	XIV-p 255
	1504	285 ± 50	1504R	510 ± 100	" "
Doroslovo	1830	2370 ± 40	1830R	2410 ± 100	XV-p 287
	1831	2010 ± 70	1831R	2040 ± 120	" "

GEOLOGICAL SAMPLES

Material	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)	Radiocarbon datelist (no.-pg no.)
Amber & Copal	2115	10 ± 50	2115R	230 ± 110	XVII-p 73
	2116	50 ± 50	2116R	280 ± 110	" "
	2211	140 ± 50	2211R	370 ± 110	XVIII-p 523
	2235	>36,000	This figure is unchanged		" "

TABLE 2b
Unpublished BM results for which revised results have been issued

Site	Original BM-no.	Original result (yr BP)	New BM-no.	Revised result (yr BP)
Portuguese	2275	6570 ± 120	2275R	6820 ± 140
Shells	2276	8040 ± 100	2276R	8220 ± 120
Collagen	2041	1270 ± 100	2041R	1490 ± 140
Amino Acids	2042	1220 ± 110	2042R	1450 ± 150
DUA Bos	2156	65 ± 35	2156R	290 ± 110

TABLE 3

Published BM Radiocarbon results known to be in error but for which no correction can be issued

Site	BM-no.	Radiocarbon date list (no.-pg no.)
British Isles		
Petters Sports Field	1620 to 1623, 1625*	XII-p 19
Billingborough Fen	1629 and 1630	XII-p 16
Barling	1631	XII-p 19
Braintree	1632	XII-p 20
Nottington Barrow	1640	XII-p 20
Blackpatch	1643	XII-p 20
Handley Barrow	1644 to 1649	XII-p 20
Milfield North	1650, 1652, 1653	XV-p 267
Bishop's Cannings	1713 to 1717	XII-p 22
Ecuador		
Hacienda Guarumel	1688,1689	XVI-p 46
Egypt		
Manchester Mummy	1602	XV-p 275
Tomb of Horemheb Saqqara	1641	XIII-p 161
Tell el-D'aba	1727 and 1728*	XV-p 275
India		
Snail shells	1670, 1671	XV-p 287
Indian Ocean		
Tortoise	1628	XIV-p 245
Pakistan		
Tarakai Kala Dherai	1690 to 1695	XV-p 281
Spain		
Ca Na Costa	1677	XV-p 282
Son Oms	1696	XV-p 282
Torralba d'en Salort	1697	XV-p 282
Ferrandell Oleza	1698	XV-p 282

* BM-1624 and BM-1726 have been remeasured: see Table 1.

https://doi.org/10.1017/S0033822200039953 Published online by Cambridge University Press