

## WERE THE RADIOCARBON DATES MANIPULATED?

Since the announcement of the C14 results in October 1988, this Newsletter has consistently distanced itself from allegations that the carbon dating findings were in any way 'rigged'. No change to this policy is envisaged. Nonetheless the Belgian Shroud scholar Remi van Haelst has recently brought to light new evidence showing not only that the laboratories did confer with each other during the testing period (which they have always denied), but also that in the light of their conferring they adjusted their data to make the results seem more clearcut than they actually were. Van Haelst's disclosures are very technical, and do not alter the C14 test's fundamental finding of a 14th century date. But they certainly deserve being brought to members' attention. Although Remi van Haelst kindly provided his article in English, in places his phraseology has been edited, hopefully judiciously, for greater clarity. He writes:

'My findings have been derived from the data published in *Nature*, and from direct communications with the British Museum Research Laboratory's Dr. Leese, who was responsible for the statistical analysis of the Shroud C14 results. I am not questioning Dr. Leese's Integrity, nor that of Dr. Tite. Both assured me that the statistical analysis was made from the data published in *Nature*. This was approved by Prof. Bray of the Colonetti Institute, Turin, even though he did not see the original laboratory data.

But now I have received information that the original Arizona data was manipulated. Instead of four sets of datings, Arizona actually provided eight.

Original Arizona data	Published in <i>Nature</i>
2May '88 606 ± 41 (80); 574 ± 45 (84)	591 ± 30 (58)
17May '88 753 ± 51 (93); 632 ± 49 (91)	690 ± 35 (65)*
24May '88 676 ± 59 (97); 540 ± 57 (95)	606 ± 41 (68)
2 June '88 701 ± 45 (86); 701 ± 46 (86)	701 ± 33 (61)
	*-Mean 646 ± 31

(All dates are quoted as years BP, i.e., before present. The error-values shown between brackets are estimates, due to the Arizona data being given without 13-C correction).

Mathematically, according to the Wilson-Ward method of calculation, eight data should give the same result as four. So why were these particular data reduced to four?

The answer is that with the quoted errors the Arizona dates span a period BP of 540 minus 95 years, (i.e. 445 years), to 753 plus 93 years (i.e. 846 years); in other words a spread of about four centuries. And it is to be remembered that any date below 650 years before present conflicts with the historical target date of 1355, that of the start of the Shroud cult at Lirey.

After receiving the Zurich results, which also had two dates below 650 years BP, on July 28 1988 Dr. Leese wrote a letter to Arizona asking to reduce the eight data to four by treating the two runs made on the same day as if they were one run. The data presented in table 1 of the *Nature* paper are therefore not the true individual measurements, but the mean of two measurements.

Arizona agreed to this because they knew that their mean result, 646 plus or minus 31 again did not ideally suit the historical target date of 1350. Although mathematically correct, this manipulation lowers the weight of the Arizona data as below:

$$\frac{(3 \times 750) + (4 \times 646) + (5 \times 676) = 685}{12}$$

versus

$$\frac{(3 \times 750) + (8 \times 646) + (5 \times 676) = 675}{16}$$

Now it might be thought that there is not a big difference between 691 (*Nature*) and 675. But making the Chi<sup>2</sup> test shows why 'it was decided to give the three dates for sample 1 the same weight:

$$\frac{(750 - 675)^2}{30^2} + \frac{(767 - 675)^2}{24^2} + \frac{(675 - 646)^2}{31^2} = 7.13 \text{ versus } \begin{array}{l} \textit{Nature} \quad 6.4 \\ \text{Cri. value} \quad 6 \end{array}$$

To pass the Chi<sup>2</sup> test the calculated value should be lower than 6. It is clear that the data presented to *Nature* are not homogeneous; and that they should never have been considered 'conclusive evidence' of a mediaeval date for the Shroud.

The fact that the Arizona data have been reduced makes many of the statements in *Nature* in error:

	<i>Nature</i>	True value
Degrees of freedom	between 2-9	between 2-13
Estimated d	5	8
Students <i>t</i>	2.6	2.26
Chi <sup>2</sup>	6.4	7.13
Unweighted mean	691	675

It has to be acknowledged that in spite of this 'manipulation' the radiocarbon dating results argue against the Shroud's authenticity. But by recalculating the data given in *Nature* on the basis of ten measurements each run, it is evident that about one third of the dates furnished by the three laboratories fell substantially outside the quoted 1260-1390 period.