

SPECIAL FEATURE:

THE DATING OF THE SHROUD TO THE MIDDLE AGES: Episodes in a game of technological bluff

Dr. Marie Claire Van Oosterwyck-Gastuche,
[Superintendent of the Royal Museum of Central Africa, Belgium]

From a recent article published in the French journal *Science et Foi*, roughly translated by the Editor (also slightly shortened), and reproduced here with Dr. Van Oosterwyck-Gastuche's kind permission

Episode 1. On the 13th October 1988, Dr. Michael Tite reported that the Turin Shroud's dates as measured by the radiocarbon method were "1260 to 1390(!)", and that the odds were astronomical against the Shroud linen being outside of the thirteenth to fourteenth century period. Effectively, a definite scientific fact had been established, proven by the datings performed by three reputable laboratories, Arizona, Oxford and Zurich, all of whom had used the advanced Accelerator Mass Spectrometry (AMS) technique based on the method of determining absolute chronology known as radiocarbon dating. Drs. Hedges and Hall added that the mediaeval date provided incontestable proof that the Shroud was the work of a forger. The proof of forgery had been found.

Episode 2. The English specialists' pronouncements went around the world, carried on an unprecedented wave of media publicity. For the future, so far as anyone was concerned, the Shroud was to be regarded as a mediaeval forgery, the date of which had been established in a "rigorously scientific manner". There seemed nothing to stand against this.

Episode 3. It was necessary to wait until 16th February 1989, and the publication of the quasi-anonymous *Nature* article (with its twenty-one expert contributors, whose relative roles went unspecified), in order to discover the 'scientific proofs' on which the 'astronomical odds' were based. Set out in extremely technical terms, the idea of odds was nonetheless missing from the abstract, the mediaeval date being presented as an indisputable certainty:

'Very small samples from the Shroud of Turin have been dated by Accelerator Mass Spectrometry in laboratories at Arizona, Oxford and Zurich. As controls, three samples whose ages had been determined independently were also dated. The results provide conclusive evidence that the linen of the Shroud is mediaeval'

Yet the odds figured strongly in the conclusions, indeed forming the major plank on which the credibility of the mediaeval date was based. As set out in order to be meaningful for non-specialists:

The results of radiocarbon measurements at Arizona, Oxford and Zurich yield a calibrated age range with at least 95% confidence for the linen of the Shroud of Turin of A.D. 1260 to 1390... These results therefore provide conclusive evidence that the linen of the Shroud is mediaeval."

The real curiosity, therefore, is that these attestations were inverted in the main text of the paper, the spread of the measurements for the Shroud being stated to be 'somewhat greater than would be expected from the errors quoted.' This demands the existence of a variable which the statistical analysis did not take account of, and which, unhappily, is impossible to identify.

Also, specifically remarking 'in the absence of direct evidence on this', the report went on to declare the mean (or average) of the dates to be significant. Now it is true that this mean is close to 1350, the date of the discovery of the Shroud at Lirey, and one of the two possible archaeological dates. But the other possible date, the first century of our era, was not even taken into account.

Episode 4. The scientific symposium on the Shroud of Turin in Paris, 7-8 September 1989. This gathering showed radiocarbon dating to be a not wholly reliable method of dating, producing many examples of dates qualified by the word 'apparent', or described as outrightly 'aberrant', because of often substantial differences from the archaeological date. Such discrepancies were often associated with the radiocarbon possibly having been affected by the migration of fluids. The symposium raised again the problem of the spread of the Shroud's radiocarbon dates as published in *Nature* together with the anomalies in the statistical analysis. It suggested that such heterogeneous dates were simply 'apparent' dates from the radiocarbon having been affected by fluids under high temperature and pressure as in the case of the fire of 1532. A switching of the samples was also suggested, an assertion which Dr. Tite ignored, in a manner somewhat typical of his overall management (Van Oosterwyck-Gastuche, 1990a).

The heterogeneity of the carbon 14 dates had also been noted by Rinaudo (1990) who supposed that this was the result of a neutron flux from the "flash" of the Resurrection. This hypothesis had been put forward a few months earlier by Phillips (1989). He had added that it could be very easily checked from the proportions of the isotopes Cl^{36} and Ca^{41} present.

Then Upinsky (1990) made a synthesis of all the known scientific evidence, and showed this to militate strongly in favour of a first century date. He concluded that a mediaeval date [as indicated by C14] was necessarily erroneous, otherwise science could only appear to be at war with itself...

Episode 5. The Paris Symposium of 1989 was the most interdisciplinary conference ever held on the Shroud, yet it received only limited media attention. The conclusions it reached were misquoted and the radiocarbon date still presented as the sole indisputable scientific point of reference, as if there was really nothing else to stand against it.

Episode 6. The radiocarbon dating specialists declined to comment on the issues of the method's inconsistencies, and the spread of dates. They also refused to make the control experiments requested (see Van Oosterwyck-Gastuche 1990 b).

Episode 7. Bourcier de Carbon (1990) and Van Haelst (1990) re-worked the *Nature* statistical analysis, coming to the same conclusions as those evident in the body of the article: that the spread of the C14 measurements was greater than that allowed by the statistical analysis, the mediaeval mean thereby having no significance. Somewhere there

was a variable which the statistical analysis had not taken into account, and which it was important to identify. (Van Haelst 1990).

Episode 8. The laboratories persistently refused to produce their raw data or to carry out the control experiments requested. All objections were ignored, the carbon dating experts seeming interested only in the image and the identity of the forger.

Episode 9. It became learned that the British Museum statistician, (who went un-named) agreed with the conclusions of the statistical analysis as re-worked by Van Haelst (letter of Dr. Tite to Van Haelst of Dec. 4th 1989, Fig. 1, below). Tite specifically wrote 'However the conclusions reached are essentially the same as ours, namely that the variation among the results of the Shroud was greater than that predicted on the quoted errors'.

Dear Dr Van Haelst

Thank you for your letter of 6 November which I have now been able to discuss with the statistician involved in the Turin Shroud dating project.

She will again point out that any differences between your and our calculations arise from the use of different weighting systems. However the conclusions reached are essentially the same as ours, namely that the variation among the results for the Shroud was greater than that predicted on the quoted errors.

In the context of the hypothetical data that you presented for the Shroud I would only reiterate that all our calculations were based entirely on the data as presented in the *Nature* paper.

Yours sincerely

M.S. Tite [signed]

Fig. 1. Dr. Tite's letter to Dr. Van Haelst

Now it was this very same attestation that had caused Van Haelst and Bourcier de Carbon to conclude that the mean was non-representative. In 1986 Tite had reached an identical conclusion at the end of similar results and specifically abandoned the mean in the case of a Chimu cotton, describing these results as non-significant. Exactly as in the case with the Shroud, with regard to this fabric 'the variation between the samples' was 'higher than expected by the quoted errors'. (Burleigh, Leese and Tite 1986). Why therefore was there this same circumstance in the text of the *Nature* paper, yet the conclusions inverted?

Episode 10. January 1990. A response from the carbon dating experts. This appeared in the specialist periodical *Radiocarbon* without the slightest notice from the media, and without any involvement of the signatories of the *Nature* paper. The author, Professor Gove from the University of Rochester, made no allusion to the findings of the Paris symposium, yet he seemed to know them well. Similarly absent was reference to any uncertainty in radiocarbon dates, these being presented as always absolute measurements of chronology with Accelerator Mass Spectrometry the best method in the world, just as one might expect from Rochester.

Omitting to address the problems of the non-representative nature of the mediaeval mean, or the value of the entire statistical analysis, Gove instead somewhat characteristically

resolved everything by simply falsifying the mean. Pretending, without showing his workings, to determine the mean with an extreme precision (1325 years \pm 33 years), he distanced himself from all the objections made and others which went unsaid, not least by ignoring even mention of any statistical calculations. Having thereby disposed of the spread among the dates, he behaved as if issues such as the control samples and the question of their origin should similarly thenceforth be beyond dispute.

He ridiculed the idea of the radiocarbon having been affected by fluids - somewhat ironical in view of the fact that the very next article in the same journal was on the subject of the problem of "apparent" dates in radiocarbon dating (Pentecost et al. 1990). As for the irradiation by neutrons hypothesis, Gove dismissed this as "one of the arguably more fanciful possibilities". After remarking that the Rochester laboratory possessed all the necessary equipment to carry out the checks on this hypothesis, he then added this telling phrase: "Even in the unlikely event that Professor Gonella, in his capacity as science advisor to the Archbishop of Turin, were to request that Rochester undertake a ^{36}Cl measurement on the Shroud, the request would be declined". [Emphasis - Gastuche]

Gove had also clearly read the claims of the Contre-Réforme Catholique, for he replied to those who had speculated on a possible switch of samples with a discreet allusion to the French monk (whom he declined to name), who had accused the honourable Dr. Tite of the British Museum of performing sleight of hand while alone in the sacristy of Turin Cathedral, right under the nose of the no less honourable Cardinal Ballestrero. He added a statement which might once have seemed reasonable enough: "It seems very convincing that what was measured in the laboratories was genuine cloth from the Shroud, after it had been subjected to rigorous cleaning procedures. Probably no sample for carbon dating has ever been subjected to such scrupulously careful examination and treatment, nor perhaps ever will again". However we for our part would comment that no group of samples analysed by carbon dating has ever been subjected to the type of statistical analysis to be found in the *Nature* paper, one that is truly unique in its genre.

Gove also ignored the epistemological problems, though he did deal with them in a rather indirect manner by recommending new researches to determine how the image was produced, a problem which he described as "most fascinating". He thought it might even be possible in time to find out the identity of the supposed person who created the image. This investigation would of course be carried out by mediaeval art experts, who should be suitably agnostic-minded. The STURP people, because of their obscurantist ideas, lacked objectivity, and were thus too easily persuaded of the relic's authenticity. Also for the most part their tests 'turned out to be inconclusive' He expressed sincere concern that some Catholics were still clinging to the myth of authenticity despite the blinding evidence of the only truly valuable means of scientific testing, carbon dating, being presented as an absolute fact. "Plus ça change, plus c'est la même chose" he remarked in French for the benefit of the famous monk whose wild allegations he deplored.

Somewhere in all this the 'astronomical odds' simply vanished without trace...

Bibliography:

Bourcier de Carbon P. (1990), 'Remarques sur l'article intitulé "Radiocarbon dating of the Shroud of Turin"', C.I.E.L.T, no. 3.

Burleigh R, Leese M and Tite M. (1986), 'An intercomparison of some A.M.S. and small gas counter laboratories,' *Radiocarbon* 28, no. 2A, pp, 571-577.

Damon, P, et al (1989), 'Radiocarbon dating of the Shroud of Turin', *Nature*, 337, 611-615.

Gove, H.E. (1990), 'Dating of the Turin Shroud - An assessment', *Radiocarbon* 32, 1, 87-92.

Pentecost et al, (1990), 'Some radiocarbon dates from tufas of the Craven district of Yorkshire' *Radiocarbon* 33, 1, 93-97.

Phillips T.J. (1989) 'Shroud irradiated by neutrons?' *Nature*, 337, 594.

Rinaudo J.B., 'Le Linceul de Turin après la datation radiocarbone, Nouvelle hypothèse,' Proceedings of the Paris Scientific Symposium, 1989. In press.

Van Haelst R. (1990) 'Statistical doubt about the C14 dating of the Shroud', *Shroud News*, 57, 20-23.

Van Oosterwyck-Gastuche M. (1990a). 'Le radiocarbone, une méthode absolue de datation?' Proceedings of the Paris Scientific Symposium, 1989. In press.

Van Oosterwyck-Gastuche M. (1990b). 'Le radiocarbone face au Suaire,' Ed. de l'O.E.I.L. In press.