Bias in Archaeology?: Anti-Statistical Prejudice *versus* Digging for Data

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Random thoughts prompted by glancing at John Wacher (1995) *The Towns of Roman Britain* (revised edition)

I have long been impressed by parallels between the sciences of statistics and archaeology. My first recollection of this lies in a chance encounter at a Rest House in Cape Coast (Ghana) in 1967, when I met an enthusiastic young archaeologist (older than me) who was researching Ashanti involvement in the slave trade. "Archaeology", he told me, "is the subject *par excellence* for Renaissance Man". It blends 'hard' science with sociology and anthropology; it requires understandings of how individuals and societies work; it uses cutting edge technology (he mentioned carbon-dating) as well as tried-and-tested ancient methods of research which have been proved over *aeons* of time such as documentary investigations blended with philosophical reasoning plus calm rationality. The attentive young would-be statistician was deeply impressed by this "Renaissance Man" metaphor (presented with no patriarchal apologies) – and I subsequently thought that statistics possesses many of these features too – what Pearson called the "buccaneering" tendency and the opportunities that statisticians have for "invading other men's domains". I think I was already realising that statistics mean *more* than numbers – we must seek to blend evidence of *all varieties*. This is something we often forget in our teaching, and the realisation may have guided me in the direction taken by my first sole book ("*Living Statistics: A Primer for West Africa"*) which I was developing at the time.

Subsequently I have worked in many areas – sociology, mobility, education, health – but apart from a brief flirtation with pollen analysis and some inspirational discussions with David Kendall about his work on ley lines, none of my work has involved archaeology. But

the "Renaissance Man" *Leitmotif* has remained with me through the decades. Has anyone else had life-changing experiences like this?

Recently I bought Wacher's book on Roman Towns. This had nothing to do with statistics – I bought it because it seemed to have a rather good synopsis with maps of Roman York, and I thought it was high time I tried to understand that period in the town that is now my home. Wacher's book is "a monumental study" which "marked a watershed" in Romano-British studies (publisher's blurb), so I decided it merited £6.80 of my hard-earned money at *Bookbutler.com*. And so it has proved.

Wacher's book is nothing if not monumental (480 tightly-printed pages full of maps, photographs and illustrations). It is clearly written. The photograph of the author looked like Nicholas Pevsner with an RAF moustache (formal, tie-bound, tweed jacket) – decidedly "old school", and none the worse for that. A terse statement in the author's 'Acknowledgements' reinforced this point of view: "… I must reserve to myself", he wrote, " all errors or omissions which may appear, as the result of holding my own opinions in the face of opposition …". This is remarkable. Many authors are just happy to say they made a mistake or forgot something – it doesn't have to be the result of stubborn (presumably) opposition against all-comers, or perhaps new-comers. You don't have to be the Last of the Mohicans in order to make a brave stand.

I was surprised to learn that Wacher died as recently as 2012, aged 85; his working life began in industrial chemistry; his Yorkshire interest was triggered by the Catterick bypass (1959). Where would archaeology be without the predations of the dreaded motor-car? And why does Wacher not have a page on Wikipedia? Hopefully this will soon be remedied.

My first skim through this book soon brought me to the author's comments (pp. 412-413) on "killer" diseases in Roman times: he notes epidemics from 50 BC through to modern times. My eye was caught by the following: "It was typhus as much as the Russians which defeated Napoleon's army in 1812 … " (I thought it was General Winter); "… In the Crimean War, 63,251 men were killed in battle, but 104,494 died of disease". My faith in these over-precise figures was not assuaged by a precise page-reference to an 1858 paper in French by Armand,

especially as I was left wondering: Is this *all* deaths? Or just French deaths? Or what?

I barely noticed the lack of statistical information elsewhere in the book until I was suddenly brought up against the author's *Preface* and *Introduction* (pp. 14-15). Fully 30% of this is taken up by what can only be called an anti-statistical mission statement that I find so remarkable I have quoted it *in extenso* in the Appendix below, from which I will summarise:

"The reader will look in vain for all the fashionable trappings of modern archaeology: no tables, no schematic diagrams, no distribution maps, no graphs or histograms … and above all ***no statistics*** *which are seldom meaningful except to the eye of the presenter"* (emphasis added), the author states with evident relish and pride old-school. This is presumably one aspect of his stubborn "own opinions in the face of opposition" referred to above. Well that's alright. I can stand a book without statistics. I wasn't expecting any after all.

But then the author went on …

"Contrary to the popular aphorism that you can prove anything with statistics, the reverse is true: nothing can ever be proved with them, since they are ***purely exercises in probability****. Yet in many places we see the figures derived from statistical analyses being quoted as evidence,* ***or even as proof****."* (Emphases added).

… and on …

Figures which have been produced for the population of Roman Britain *"vary so wildly as to make it a useless calculation based more on guesswork than anything else …. Archaeology is not an exact quantitative science and it is doubtful it ever will be."*

… and on …

"(Q)uantitative methods can only be successful if the calculations are, to a great extent, based on factual observations. Analysis all too readily shows that many of the so-called 'facts' about Romano -British towns are compounded of a mixture of inference, analogy, extrapolation, surmise and presumption. … ***To apply quantitative methods in our present state of knowledge is, therefore, not only misguided but***

probably also misleading, since it cloaks the information that we have with a spurious authenticity."

In part, I assume this was the author's reaction to professional entryism by "Young Turks" wielding new, quantitative weapons which do less than they claim, and confuse and terrorise the opposition. I can sympathise with some of the points made:

- in statistics, as in other areas, there are indeed fashions and "fashionable trappings"
- nothing can be *proved* by statistics, I agree – but reliabilities vary, and truth differs from lies and untruths
- statistics may indeed be "*quoted as evidence"*
- "*Archaeology is not an exact quantitative science and it is doubtful it ever will be."*
- *"(Q)uantitative methods can only be successful if the calculations are … based on factual observations"*
- *many so-called 'facts' are compounded of a "mixture of inference, analogy, extrapolation, surmise and presumption".*

Around the time of Wacher's first edition (1974), sociology too was witnessing a reaction against the 1960s *penchant* for over-enthusiastic quantification. I recall Cathie Marsh at the very first meeting of Radical Statistics (January 1975) contrasting Otis Dudley Duncan's 1960s path analyses of social mobility (hardly a "Young Turk", however) with the anti-method positions of Paul Feyerabend and others in the 1970s. Feyerabend would however have made a grand philosopher's meal from Wacher's compounding of *"inference, analogy, extrapolation, surmise and presumption".* For Feyerabend, each of these five terms could merit a page or so in order to unpack their differences.

Several other points made by Wacher gave me pause for thought: What does he mean? Is he correct?:

- some statistics are meaningful only *"to the eye of the presenter"*
- statistics are *"purely exercises in probability"*
- statistics are often "*quoted … as proof"*

Further statements from Wacher are in my view either completely misconstrued or wrong:

- Population estimates which *"vary so widely as to make it a use-less calculation based more on guesswork than anything else"*
- Applying quantitative methods in our present state of knowledge is *"not only misguided but probably also misleading, since it cloaks the information that we have with a spurious authenticity."*

Just because things vary widely does not make them useless. But analysts must know how to express such wide variability – means and variances are certainly not enough! Pictures may be best – and may appeal to Wacher more (dotplots etc.). Perhaps he did not know about them.

Equally, it is important to avoid "cloaks of spurious authenticity", and that is what good statistical analysis can do. Again, Wacher may not have known about this. Might his anti-statistics stance be based upon a pretty poor understanding of what statistical analysis is all about, and possibly a reluctance to study and engage? That would be understandable as he clearly has such expertise in other areas. But in that case it might have been wiser and less damaging if he not issued such a condemnatory *fatwah* against the whole big tent of statistics and quantitative methods.

The important thing in statistics is evidence. It does not have to be quantitative evidence. Statisticians have a responsibility to stress this point. And if statistics is the "science of evidence", then it certainly includes the study of how to "construct" evidence (surveys, experiments, or even *data trouve*) as well as how to *deconstruct* it. If 'digging' for data, we need to know (a) where best to dig, and also (b) how correct inferences from whatever we find depend upon the place we dug.

Statistics in archaeology is not a "God that has failed" – if anything, it is a God that has not been tried. Early disciples may have been seduced by the sublime intricacies of modern technology and mathematicalisation. These languages obscure to deceive; they are professional smokescreens; mumbo jumbo that the riff-raff cannot possibly understand. The true believer should have no truck with them. But to confront them effectively, their substance must be understood. Wacher was too otherwise-engaged to truly know the methods he castigated so stridently and so insistently. He made a

pride of it. One hopes that he did not too-much damage succeeding generations of archaeologists. We can certainly all learn from him.

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APPENDIX: Verbatim anti-statistical text from Wacher (1995:14-15)

"The reader will look in vain for all the fashionable trappings of modern archaeology: no tables, no schematic diagrams, no distribution maps, no graphs or histograms … and above all no statistics which are seldom meaningful except to the eye of the presenter. Seldom has such a useful tool in the archaeologist's workshop been so consistently misused as the latter. Contrary to the popular aphorism that you can prove anything with statistics, the reverse is true: nothing can ever be proved with them, since they are purely exercises in probability. Yet in many places we see the figures derived from statistical analyses being quoted as evidence, or even as proof. By all means let them be recognised for what they are: useful probabilities, but much greater caution is needed in the handling of the information so produced. Neither has any attempt been made to compute populations. Figures which have been produced for those of Roman Britain vary so wildly as to make it a useless calculation based more on guesswork than anything else (from ½ million to 6 million quoted by Millett 1990. To arrive at his calculated figures for the urban population of between 183,971 and 290,057 is a prime example of meaningless over-accuracy). Archaeology is not an exact quantitative science and it is doubtful it ever will be.

"No quantitative methods have been used … Such methods can only be successful if the calculations are, to a great extent, based on factual observations. Analysis all too readily shows that many of the so-called 'facts' about Romano -British towns are compounded of a mixture of inference, analogy, extrapolation, surmise and presumption. … To apply quantitative methods in our present state of knowledge is, therefore, not only misguided but probably also misleading, since it cloaks the information that we have with a spurious authenticity." (Pp. 14-15 of Wacher 1974, comprising some 30% of the Preface and Introduction)