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# The first British textbook of medical statistics

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In introductory remarks in the first edition of *An Introduction to Medical Statistics*, Hilda Woods and William Thomas Russell indicate that their book is intended 'only as a simple introduction to statistical analysis suitable to the needs of those taking the course for the Diploma in Public Health', presumably at the London School of Hygiene and Tropical Medicine (LSHTM). The book<sup>1</sup> was published by PS King & Son Ltd, Orchard House, Westminster (and printed in Great Britain by Richard Clay & Sons Limited, Bungay, Suffolk). A second edition followed in 1936 from the same publisher (but printed by Phototype Ltd, in Barnet, Hertfordshire), and this was re-published in 1948 by Staples Press (Cavendish Place, London, and printed by them at Great Titchfield Street, London).

The contents (11 chapters) and pagination of the two editions of the book are almost identical. A line by line comparison of the first and second (reprinted) editions reveals very few differences between them (correction of two figures in the table on p. 45, some changes to digits after the decimal point [p. 61, 63, 64, 86, 92, 93], and minor word changes [diagram V, p. 51, 61] or small additions [p. 105]). The chapter titles and subheadings are shown in the table.

**Table 1**  
Contents of *An Introduction to Medical Statistics* by Woods and Russell

Chapter	Title (subheadings from contents)
I	Vital Statistics The Census Registration of Births and Deaths

*(Continued)*

**Table 1**  
Continued

Chapter	Title (subheadings from contents)
	Registration of Live Births Registration of Deaths Still-births Registration of Sickness
II	Tabulation of Data
III	Construction of Charts and Graphs
IV	Population Estimates: Arithmetic Estimates: Geometric Birth-rate Death-rates Infant mortality Specific Death-rates Proportional Mortality Occupational Mortality
V	Standardised Death Rate Direct Method Indirect Method Occupational Mortality
VI	Averages Arithmetic Mean Median Mode Frequency Distribution
VII	Measures of Dispersion Range Mean Deviation Standard Deviation Standard Deviation of Ungrouped Series Standard Deviation of Grouped Series Coefficient of Variation
VIII	Correlation Coefficient of Correlation

*(Continued)*

**Table 1**  
**Continued**

Chapter	Title (subheadings from contents)
	Coefficient of Correlation for Ungrouped Data
	Coefficient of Correlation for Grouped Data
IX	Coefficient of Regression
X	Life Tables
XI	Sampling
	Sampling of Attributes
	Sampling of Variables

The passage of the book selected for presentation in the James Lind Library<sup>1</sup> cautions readers against basing causal inferences about the effects of treatments solely on statistical analyses, and goes on to emphasize the arbitrary nature of any choice of level of difference observed in a comparison deemed to be a threshold to 'truth'.

The book has a Preface by Major Greenwood, Professor of Epidemiology at the LSHTM, who states that 'the object of this little book is to help a student acquire facility and confidence in carrying out the simpler operations of statistical analysis'. He continues 'For the general reader who wishes to understand economic and social statistics there are plenty of guides. But the statistics of the General Register Office are quite as important as those of the Board of Trade or the Ministry of Labour to anyone who wishes to understand the world we live in, and guides to the methods used in analysing them are not so easy to find', a view with which we concur.<sup>2</sup>

The book has no index or acknowledgements though it has textual references to two books on vital statistics (George Chandler Whipple's *Vital Statistics: An Introduction to the Science of Demography* and Newsholme's *The Elements of Vital Statistics in their bearing on Social and Health Problems*), and one paper by Woods (A note on the graphic method of graduation in the construction of life tables. *Lancet* 1929;1:941–2). Those who desire to study the subject further are recommended to read Udny Yule's *An Introduction to the Theory of Statistics* and Raymond Pearl's *Introduction to Medical Biometry and Statistics*. At the end of the first edition there is a list of 'books to read' in the form of an advertisement. This includes the two

statistics books by Arthur L Bowley (*Elements of Statistics*, fifth edition, and *An Elementary Manual of Statistics*, fourth edition), as well as his book with MH Hogg *Has Poverty Diminished?*, followed by other books on public health, health administration, and social conditions.

We are aware of two published reviews of the first edition of Woods and Russell, one in the UK and one in the USA. The former was published in the *Journal of the Royal Statistical Society* in 1931, and was by G.U.Y. (clearly George Udny Yule, 1871–1951). Yule<sup>3</sup> quotes from Greenwood's introductory preface explaining that the book is intended to help the student acquire the facility and confidence to carry out the simpler operations of statistical analysis. Further he suggests that any student who has worked through the course at LSHTM for which the book is intended, should be prepared to go further and tackle books on pure vital statistics, such as Newsholme and Whipple or even Pearl's book on biometry. Yule 'found little to criticise' and confined his comments to the retention of fewer figures in some worked examples, the reason against the choice of the 1901 population as a standard, and sundry printer's errors. He also made a plea for the inclusion of a chapter on the trustworthiness of data, on the difficulties of comparison due to continually changing classifications, both in census and in registration data, to improvements in diagnosis, and so forth.

By contrast, the American reviewer, Edwin W Kopf (1888–1933), is scathing.<sup>4</sup> He declares 'the authors have failed definitely to accomplish the purpose they had in view', with explanations that are 'vague and misleading.' He notes that '*de facto*' (actually resident) and '*de jure*' (legally resident) populations are discussed without clear definition; the passage on quantitative data is meaningless; confusion between fertility and fecundity; that the definition of infant mortality is clearly wrong; lack of agreement between the definition of attack rate and the example; and then broadens his criticism to whole chapters – those on averages, measures of dispersion and correlation 'will certainly mislead students', that on life tables is 'badly confused', and the chapter on sampling 'seems nowhere to be suited to the needs of students examining quantitative data on pathological phenomena.' His final shot is the lack of a definition of medical statistics: 'it seems

impossible to impart instruction in a subject without telling the students what the discussion is about.'

Kopf worked for the Metropolitan Life Insurance Company in New York, he was a Fellow of the American Public Health Association, and a Fellow and Chair of the Educational Committee of the Casualty Actuarial Society (in 1931). He wrote about the statistical work of Florence Nightingale (*Journal of the American Statistical Association* 1916;15:388–404), a statistical study of the influenza epidemic (1919), and about the origin and development of reinsurance (1929), and co-authored a paper (with Fales and Tobey) on *Vital Statistics: Constitutional, Statutory, and Administrative Aspects*, and a book (with Dublin and Van Buren) *Mortality Statistics of Insured Wage-earners* (1919). Kopf was also a learned discussant of a paper on an analysis of the death rate of Detroit by Deacon. Kopf was clearly an expert on both vital and actuarial statistics, as was Yule, and it is rather perplexing to see such polarized views on the Woods and Russell book. However, some of Kopf's criticisms are not specific and our reading of relevant passages of the book suggests that they may be slightly pedantic.

Greenwood<sup>5</sup> was furious. Ever supportive of his staff, Greenwood's riposte was a 'an open letter' published in the *Journal of the American Statistical Association*, which opens by referring to 'a Mr. Kopf' (our italics). Kopf had written that Greenwood had declared in his Preface in the book that 'the young medical men and women coming under instruction in...the London School of Hygiene...are taught to carry out with facility and confidence the statistical operations which a Medical Officer of Health must supervise.' Greenwood accuses Kopf of putting 'a silly brag into my mouth', and after correcting the misquotation continues:

*no experienced teacher is fool enough – to put it no higher – to promise 100 per cent of successes. How on earth, for example, could I, or any other teacher, in a much longer course than we give at the London School of Hygiene expect to teach Mr. Kopf to make accurate statements?*

Kopf had also stated that the definition of infant mortality was 'clearly wrong' (see above). In reply, Greenwood quoted the text – 'infant

mortality is generally measured as the deaths under 1 year per 1,000 births in the same year' – and observed that 'this is not a definition of anything, but an accurate statement of the practice of the General Register Office of England and Wales.'

Greenwood's final paragraph was a *coup de grace*:

*Whether this book is or is not of educational value is clearly a matter on which two opinions are possible. I do not think two opinions are possible as to the impropriety of the statements to which I have called attention.*

We are not aware of a response from Kopf.

In 1948, there was a further very brief review of the 1948 reprint of the second edition of Woods and Russell in the *British Journal of Industrial Medicine* (1948;5:62), which followed a review of the fourth edition of Austin Bradford Hill's *Principles of Medical Statistics*. The book is described as more elementary than Hill's but 'also a very useful introduction to medical statistics, suited to the needs of people studying for the Diploma of Public Health.' In addition, the reviewer (who was identified only as JLN) indicated that 'the exposition throughout maintains a high standard of clarity.'

We have discussed the connections between Bradford Hill and Woods and Russell elsewhere.<sup>2</sup> Our brief accounts of the lives of Hilda Woods and William Russell are available in the James Lind Library.<sup>6,7</sup> A longer article on Hilda Woods has been published recently.<sup>8</sup>

## References

- 1 Woods HM, Russell WT. *An Introduction to Medical Statistics*. London: Staples Press, 1931
- 2 Farewell V, Johnson T. Woods and Russell, Hill, and the emergence of medical statistics. *Stat. Med.* 2010;29:1459–76
- 3 Yule GU. Review of *An Introduction to Medical Statistics* by HM Woods and WT Russell. *J R Stat Soc* 1931; 94:628–30
- 4 Kopf EW. Review of *An Introduction to Medical Statistics* by HM Woods and WT Russell. *J Am Stat Assoc* 1932;27:115
- 5 Greenwood M. An open letter. *J Am Stat Assoc* 1932;27:310
- 6 Farewell V, Johnson A. *Hilda Woods (1892–1971)*. The James Lind Library. 2010. See [www.jameslindlibrary.org](http://www.jameslindlibrary.org)
- 7 Farewell V, Johnson A. *William Thomas Russell (1888–1953)*. The James Lind Library. 2010. See [www.jameslindlibrary.org](http://www.jameslindlibrary.org)
- 8 Farewell V, Johnson T, Gear R. *Hilda Mary Woods MBE, DSc, LRAM, FSS (1892–1971): reflections on a Fellow of the Royal Statistical Society*. *J R Stat Soc Ser A Stat Soc, Series A*, 2012;175:799–811