

siblings (with whom they have equal genetic similarity), etc. The conflicting heritability estimates fall nicely into place on this hypothesis, but do not and cannot converge on a single better estimate. The reason is that, once different figures for environmental similarity are required for different kinships, the heritability equations become underidentified; there are more unknowns to solve for than there are equations, and no single estimates can be made. The only confident conclusion, Taylor states, is the tautological one that “the heritability of IQ is somewhere between zero and 100 per cent (p. 206)”.

The ordering of kinships on environmental similarity is only one of the many provocative and insightful analyses that Taylor offers. He clearly sets out the logic and the problems in most of the main attempts to estimate IQ heritability by comparing kinships two, three, and many at a time. He shows both the strengths and the limitations of the currently popular path analysis methods. He exposes a shocking number of simple arithmetical errors in the writings of many of the leading figures in the IQ controversy. Finally, but not least important, he combines a high level of mathematical sophistication with an ability to write clear, simple, and accurate non-technical summaries. The book, nevertheless, is not without its faults. In the chapter on “The myth of the separated identical twins”, Taylor rightly points out that such twins often have very similar environments, but then confuses “uncorrelated” environments with “minimally similar” ones. He argues that only those twins raised in the latter should be included in the calculations of the IQ correlation for identical twins raised in random, uncorrelated environments. However, truly random allocation of twins would have to result in as many going to high-similarity environments as to low-similarity ones, and calculations based only on the low-similarity environments would be very misleading. Taylor acknowledges the problem in a footnote, but does not resolve it. Again, in his otherwise excellent discussion of the assumptions involved in analysis of variance models for estimating heritability, Taylor is unclear about the relationship between the assumptions of additivity, linearity, and non-interaction. Viewed in the context of the total work, however, these blemishes are minor. Taylor has produced a book that is at the same time the most rigorous and sustained challenge to specialists in the field of IQ heritability, and the clearest and most comprehensive introduction to the problems of the field for non-specialists.

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MAURICE GOLDSMITH, *Sage. A life of J. D. Bernal*, London, Hutchinson, 1980, 8vo, pp. 256, illus., £8.95.

J. D. Bernal confronts the historian of science with perhaps the greatest challenge of any major scientist of the twentieth century. There are his many-faceted interests and activities, difficult adequately to encompass; there is the curiousness of his scientific career – brilliant, even seminal work in crystallography, but never quite realizing the awesome potential to which all his contemporaries testify; there is, of course, his political and social radicalism, carried through to the end of his life, and inevitably eliciting controversy now, as it did during his life.

Book Reviews

Recently, Bernal has received a spate of published historical analyses: first in Gary Werskey's book, *The visible college*, (London, Allen & Unwin, 1978) and now in *Sage*, the biography by Maurice Goldsmith. Goldsmith has boldly attempted an all-encompassing study of Bernal – his career as a crystallographer, his war work for the government, his activities to make scientists politically, socially, and morally aware of their responsibilities, his espousal (and defence) of Soviet communism, his writings – even his love life – in 235 pages. As a long-time friend and associate of Bernal, and himself, a “science policist”, Goldsmith ought to have been in a good position to write a perceptive biography of Bernal, even in 235 pages, notwithstanding that he was hobbled by being refused access to many of Bernal's papers. But despite much informative detail, the biography is a disappointment. This is not simply because Goldsmith has tried to package his complex subject in so brief a book. Rather, it has to do, I fear, with Goldsmith's inability to handle the mechanics of good biography or even good prose. In particular, he seems not to understand how to appropriate anecdote or epigram to illuminate his subject. An example from the final paragraph of the book will demonstrate what I mean:

Bernal was a man whose achievements have an all-embracing freshness. The future was always with him. It presented itself in many forms: the embrace of a woman; the urgent entry into a problem; the temperature of the morning; a visit to an art gallery; a scientific paper to be written or delivered; a telegram from a world political leader; an appeal for a signature against an injustice. And these different forms, which reflect faithfully his passionate times, were all linked into one pattern of understanding. He knew that this wide knowledge made life more complicated, but that was essentially what being a human meant – to think rationally, and to define and solve problems.

A study worthy of Bernal is still awaited.

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