

Angles on intelligence

H. J. Eysenck

Handbook of Intelligence: Theories, Measurements and Applications.
 Edited by Benjamin B. Wolman. Wiley:1985. Pp.985. \$64.95, £66.45.

THE concept of intelligence has a paradoxical standing in psychology. On the one hand it has always been regarded as the prime example of the possibility of measuring mental qualities with considerable reliability and validity; on the other, it has been subjected to a good deal of criticism and indeed obloquy. There have been unending arguments about many different aspects of intelligence, from the generality of the concept to the question of the relative importance of genetic and environmental factors. Much of the controversy has been uninformative, probably because there are at least three different concepts of "intelligence" which are frequently mixed up by the various parties involved.

In the first place we have what Donald Hebb called "Intelligence A" (that is, the biological foundation for all cognitive behaviour). Then we have "Intelligence B" (the application of this intelligence to life problems, which is much influenced by personality, education, cultural factors and many other extraneous influences). Last, we have "Intelligence C" (psychometric intelligence as measured by IQ tests). To have a worthwhile scientific argument, we must specify which of these we are talking about, and unfortunately the many authors in this book often fail to be clear about the particular meaning of intelligence they intend. This accounts for at least some of the contradictions which are apparent in their many diversified contributions. An introductory chapter discussing the concept of intelligence from the historical and philosophical points of view might have helped to clarify matters; unfortunately the book jumps in at the deep end, and never attempts seriously to unravel these tangled issues.

Actually the recent appearance of not one, but two handbooks on intelligence (the *Handbook of Human Intelligence*, edited by Robert Sternberg, was published by Cambridge University Press in 1982) indicates a renewed interest in the subject after several years of relative neglect. Both handbooks cover the new developments although they stress rather different aspects. There can be no doubt that this rebirth of interest is welcome; intelligence is a central concept in psychology, and the discovery of anything new in this field must inevitably lead to a re-evaluation of its meaning.

As both books show, there is much agreement on two issues. One is the im-

portance of genetic factors; this is not seriously doubted by any expert, although outsiders such as Kamin are still willing to argue the toss on the basis of ideological rather than scientific notions. Second, agreement on the importance of a general factor of intelligence (*g*) is almost but not quite unanimous; here too the aberrant notions of the 1960s and 1970s have had to bow to the strength of the evidence. The chapter in *Handbook of Intelligence* by J.P. Guilford on his structure-of-intellect model still stoutly argues the case against *g*, but his methods of analysis have been sharply criticized by almost all experts in the field, including John Horn and Nathan Brody, both of whom also contribute chapters to this book. Guilford's belief in the existence of some 120 "intelligences", all independent of each other, is simply not tenable in view of the fact that all the relevant tests are highly intercorrelated, and also correlate highly with typical IQ tests. Guilford argues somewhat ingeniously that some of the observed correlations are quite low, but fails to mention either that most of them are very high, which should be impossible on his theory, or that those tests which have low correlations are practically always those which have very poor reliabilities.

Guilford's chapter typifies one of the weaknesses of the present book, namely a tendency to let the authors ride their particular hobby horses. The worst example is probably a chapter in which Allen and Nadeen Kaufman blow the trumpet for the Kaufman Assessment Battery for children, praising their own work and neglecting to mention the many criticisms that can be, and have been made of their approach. What, for instance, might the validity of this test be? Practically the only information given is that it correlates around 0.7 with the Wechsler IQ, that is, about the same or slightly less than correlations usually observed between different IQ tests. Actually the correlation is about the same as that which Nathan Brody suggests, from a survey of the evidence on different choice reaction times, can be obtained between IQ and reaction time! One would need a great deal of persuasion before accepting the claims made by the Kaufmans for their new test, and it is certainly unusual to allow protagonists the chance to advertise their wares in a book such as this.

There is no question that many of the chapters are very informative, particularly

those on genetics, neurological foundations, the life-span development perspective, the validity of tests of intelligence, environment and IQ, and several others. Nevertheless there are other fundamental faults. The book is parochial both in its authorship (almost exclusively North American) and in its inclusiveness. In the chapters dealing with factor analysis, there is no mention of such figures as Meili in Switzerland or Jaeger in West Germany. Equally, there is no mention of Lienert's important contribution — his demonstration that the number of factors extracted from a matrix of intercorrelations between IQ tests is significantly smaller for children who are emotionally unstable as compared with those who are emotionally stable — or of several other German studies replicating and extending this finding.

In the chapter on genetics, too, no place has been found for discussion of such work as that of Volkmar Weiss in East Germany, or of Lippovechaja, Kantonistova and Chamaganova in the USSR. It is not only that these authors have shown that genetic factors are equally important in socialist countries as they have proved to be in capitalist ones, a vital point in itself; Weiss has also made important theoretical contributions to the analysis of genetic factors in intelligence which run counter to much current thinking.

Of the many omissions, the most striking is probably that of a chapter dealing with the speed-of-information-processing theory of intelligence, which has found much support in recent work on the correlation between reaction time and intelligence, and also the relationships between IQ and evoked potentials. There is no discussion of this research in the chapter where it should belong, namely that on neurological foundations of intelligence; Nathan Brody is the only one, for instance, who mentions the work of the Hendrickson's and he does so only in passing, and without mentioning the equally important work of Schafer, Robinson and others. This is fair enough in a chapter dealing with the validity of tests of intelligence, which has rather different concerns; but to include a chapter on a theory such as Guilford's, which is almost universally rejected, and not include one on these modern theories which have a great deal of experimental support, and seem to change our interpretation of intelligence test results quite drastically, is inexcusable. It is curious that Sternberg's *Handbook* erred in exactly the same direction; is it possible to detect the hidden hand of the *Zeitgeist* here?

A last few words may be appropriate, comparing the two books. Sternberg is stronger on the theoretical side, Wolman on the applied. Wolman has a whole section on "applications", dealing with men-

tal health, clinical applications, clinical uses of the Wechsler, and educational applications, as well as chapters in previous sections on group tests of intelligence, the assessment of mentally retarded individuals, giftedness, transcultural assessment, and clinical assessment of children's intelligence. Factor analysis is much more prominent in Wolman than Sternberg, but the latter is far more concerned with cognitive theories, and particularly various componential theories; these are not even mentioned in the subject index of Wolman. From the point of view of the buyer, the Sternberg book is more academic, the Wolman more applied — as is not surprising, in view of the fact that it is dedicated to the memory of David Wechsler, whereas the Sternberg book deals more with the kind of theories associated with the name of the editor. It

is impossible to say that one book is better than the other; both make important contributions, and many of the chapters in both are excellent. In addition both offer a useful collection of references.

Neither, however, really lives up to the claims one would normally make for a handbook. A handbook that really dealt with the important issues that arise in the measurement of intelligence, did not leave out non-English-speaking authors who have made seminal contributions to the subject and did not evade discussion of important recent studies would be well worth having. Until such a volume is produced, we will have to make do with what we are offered. □

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The Faraday effects

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Faraday Rediscovered: Essays on the Life and Work of Michael Faraday, 1791–1867. Edited by David Gooding and Frank A.J.L. James. *Macmillan, London/Stockton, New York: 1985. Pp.258. £30, \$60.*

“SCIENTISTS”, remark the editors of this volume, “are inveterate myth builders”. If this is so — and who could survive without folktales and fictions? — few could have been so triumphantly romanced as Michael Faraday (1791–1867). To Maxwell, he was a friend “entirely free from pride and undue self-assertion”; to Tyndall, a conquering hero “who took no cities but captivated all hearts”; and throughout Bence Jones’s reverential *Life and Letters of Faraday* (1870) a paragon of “supernatural” virtues. Only the occasional discordant note could be heard, and that invariably from France, a land with its own fabled *savants*. Which shows perhaps the universal need for scientific heroes, and the fact that myths do not on the whole travel well.

For a nation which professed to have abandoned idolatry Victorian England offered itself remarkably quickly at the shrine of science. Biologists, geologists, chemists and physicists having become a new scientific clerisy, it followed that they should be accorded respect and approached with veneration. Remembering an audience she had with Faraday in 1850, Mrs Cornelia Crosse spoke of the “awe” which overcame her:

With the knowledge that we were approaching the Arcana of Science, I was in no condition of sympathy with the fools who rush in, but felt restrained by the reverent attitude of those who fear to tread on sacred ground.

Such devotion could not have been won without Faraday’s consent. Indeed, one of the pleasures of this set of original essays is that it forsakes the easy opportunity to ridicule this particular “Faraday effect” in favour of the more difficult task of unravelling its roots, growth and impact. Stepping beyond the enormous archive of documentation left us by Faraday, the contributors begin to take a just measure of the man. We can then see how little is revealed — and how much concealed — by invoking as explanations for Faraday’s achievement those favourites of the nineteenth-century biographer, “native genius”, “self help” and “moral rectitude”. Instead comes the attempt, partial but successful, to place Faraday’s life and work in context.

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Plain no more — Michael Faraday, with his wife, c. 1840.

Many new themes emerge from this enterprise. By comparison and contrast with Wheatstone, Ampère and Davy we can begin to follow the development of Faraday’s interests and the impact of his theoretical and practical innovations in the domains of electrodynamics and electrical engineering. But to account for his success as a scientist we need to understand how he suited that role and how he made that role suit him. More than any equivalent figure, Faraday’s private life and public image were intertwined. For 32 years he was Fullerian Professor of Chemistry at the Royal Institution, and with that position came an apartment in the building. Transitions from lodging to laboratory, thence to lecture theatre, were easy and frequent. Who, then, was the real Faraday? The homely, devout Christian; the tireless, inventive experimenter; or the irresistibly eloquent public speaker? The answer is that Faraday was all and none of these. His science cannot be separated from his religious beliefs, as Cantor shows here in an exploration of Faraday’s Sandemanianism. Nor can the man be disassociated from the myth: through the many photographic portraits of him, Faraday seemed to grow into his public image.

At a more intricate level, essays by Gooding and James reveal how Faraday used the lecture theatre to present to his audience as obvious, collectively-witnessed “facts” those findings which he had single-handedly, and often with immense difficulty, produced in the laboratory. Experiments served an obvious educative role, but they also reaffirmed the status of scientific knowledge as objective and reproducible. It has often seemed as though Faraday’s objections to the use of mathematical operations were based on prejudice, particularly since they were expressed in an era which witnessed the ever-increasing incursion of mathematics into large areas of physics. This volume shows, on the contrary, how integral to his style, and scientific and religious beliefs, these objections were.

No single figure emerges from this book which could replace the one we have lost. Faraday has fallen from his pedestal but acquired other dimensions and depths. It is doubtful whether a cogent identity will — or should — result from further historical researches into Faraday’s life and work. One of his last requests was to remain “plain Michael Faraday to the last”, but Faraday rediscovered can be plain no more. □

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