

## Scotland's Greatest Psychologist

# J.C. RAVEN AND CONTEMPORARY PSYCHOLOGY

John Raven

For years, Tommy MacKay tried to persuade me to write a short article on my father's contribution to psychology. Now he has succeeded – by getting me talking about the way in which my father's work relates to problems with which contemporary psychology is still trying to grapple.

The probability that my father *has* made a contribution to contemporary psychology would seem to follow from the fact that, according to a survey conducted by Oakland (1995), the *Raven Progressive Matrices* is, geographically, the second most widely used test in the world; coming after the *Wechsler Intelligence Scales for Children* and before the *Bender Gestalt* and the *Rorschach*.

Unfortunately, tests often perform sociological, rather than psychological, functions. Thus, most tests employed in education perform the twin sociological functions of legitimising the rationing of privilege and perpetuating a divided and dysfunctional society instead of contributing to the recognition and development of talent (Jencks et al., 1973; Raven, 1991). By the same token, the RPM may be being used to do such things as eliminate most applicants from consideration for jobs or to create an expensive pretence that something is being done about children's educational difficulties (1) rather than for any psychological purpose.

So, is there any evidence that the RPM is making a contemporary contribution to the advance of scientific understanding? Indeed there is.

The test was developed as an easy-to-use,

theoretically based, and clearly interpretable, measure of one component of Spearman's 'g' (namely *eductive* ability [from the Latin *educere* – the ability to draw meaning out of confusion]) in order to facilitate investigation of the genetic and environmental origins of mental defect.

Remarkably, use of the same test in the same way in many different countries over 50 years has thrown considerable light on this fundamental question. It has become clear that certain aspects of the environment have had a dramatic effect on eductive ability. The result has been a one-standard-deviation-per-generation increase in scores (Flynn, 1984, 1987) and a demonstration that what had previously been thought to be a decline in the "ability to think" with age is, in reality, an increase in scores over time. The cross-cultural consistency in these data show that the environmental variables which are responsible for the increase are not those with which most psychologists and sociologists are preoccupied (Raven, J., Raven, J.C. and Court, 1995). Nor does this evidence of mutability indicate any decline in heritability. Further, reproductive ability – knowledge – has been largely unaffected by the huge increase in the time young people spend in the educational system.

A few other examples of the way in which the use of the RPM has, in recent years, contributed to advance in scientific understanding may also be mentioned.

To appreciate their significance it is, however, necessary first to understand that the Item Response Theory-based item

analysis employed in the development of the Test (in the '30s) shows that "cognitive ability" "exists". That is, it demonstrates that, although the test items are qualitatively different in character, the processes required to solve them are cumulative. The processes required to solve the easier "perceptual" items are continuous with those required to solve the more difficult "analytical" ones. On the one hand, this illustrates that perception is a conceptual process. On the other it shows that the concept of "cognitive ability" is analogous to the concept of "hardness", the value or "existence" of which is not invalidated by the fact that it is different substances which display different levels of the characteristic.

At least three recent studies reinforce the claim that "eductive ability" is every bit as real as hardness or atoms and of fundamental importance. Deary (1993, 1995) has documented a previously unsuspected correlation between cognitive ability indexed by several methods – including the RPM – and "inspection time". Vodegel-Matzen (1994) has shown that making the Matrices designs more "realistic", i.e. changing the elements in the designs into such things as bananas and hats, while preserving their logic, makes them easier *for everyone* – and not just the "academically unsophisticated" – but does not significantly alter the rank order of items or people. And Styles (1995) has shown that the Item Characteristic Curves for a series of Piagetian tasks map onto those for the RPM. It follows that "cognitive ability" is a continuous variable lacking stage-like discontinuities.

Broadening out the discussion, my father actually contributed to the development of a more precise formulation of a "distributed" and "multiple-intelligence" theory of "intelligence" than that offered by Gardner

(1983, 1991). He did this by introducing the concept of "military intelligence" into discussions of "intelligence". The generation of military intelligence requires a large number of people who do very different things. It requires some field agents who rely on their feelings to tell them what is significant and then check those hunches through "experimental interactions with the environment". It requires someone who can get a team to work together. It requires someone who can see patterns in apparently disparate bits of information arriving at a centre. And it requires someone who can understand social and political systems in such a way as to be able to legitimise, and promote the flow of funds into, the work. These different activities require people who are strongly motivated to undertake very different kinds of task – but all of whom require eductive ability to undertake those activities effectively. Couched in contemporary language, what he was leading his protagonists to realise was that "intelligence" is something which needs to be studied at a group or cultural, not an individual, level. It is an emergent property of groups. Furthermore, eductive activity is only one of a number of psychological processes that are required to undertake each and every one of the necessary component – and potentially engaging or motivating – activities effectively (2).

Setting eductive ability in a framework for thinking about the kinds of activity which people may be strongly motivated to undertake and other competencies required to undertake those activities effectively leads to other insights.

First, about methods of validation. Given what we have seen about the psychological and social context in which eductive ability expresses itself, it is clearly going to be

---

## Scotland's Greatest Psychologist

---

impossible to validate any test purporting to measure any important component of competence through simple correlational studies. To validate measures of such qualities one would first have to get inside people's heads and find out what they were really doing (as distinct from what someone else thought they should be doing). Despite the directness with which this conclusion flows from the example, Messick (1989, 1991) has more recently had to mount an intensive campaign in an attempt to stem the quest for validation studies based on first-order correlations (3).

Second, about measurement. Given that finding new patterns in previously overlooked "data" demands the use of feelings to suggest hunches, the initiation of action to check those hunches through "experimental interactions with the environment", and persistence, it is obvious (a) that what has been termed "cognitive activity" is not primarily *cognitive* at all but affective and conative (and it may be noted that the RPM picks up all these components). Unfortunately, (b), since educative ability and other high-level competencies are all difficult and demanding activities, people are not going to develop and display them except *while they are undertaking tasks they are personally strongly motivated to undertake*. That's bad news for the Progressive Matrices. It means that "cognitive ability" is going to look very different when displayed in the context of a concern with putting others at ease and in the context of making an original contribution to science. Cognitive ability measured in these contexts will yield very different rank-orders of individuals. What is more, "cognitive activity" measured through tests set in these different contexts is likely, as Trevarthen (1990) and Sperry (1983) have argued, to suggest that

"cognitive ability" has different neurological loci. What will be needed to make sense of the data will be the recognition that it is not "cognitive ability" which is neurologically localised but motivational predispositions to "think" about very different things.

In other words, the main questions we must be concerned with as psychologists will not hinge on questions like "How well can this person think?", but "What does this person tend to think about?".

Having stumbled into this discussion, it becomes obvious why, during the '50s, my father was preoccupied with questions like "How do people utilise their present abilities, their past knowledge, and their acquired skills, to undertake activities they value and in such a way as to achieve desired future goals effectively?"

He explored these questions using a variant of his Vocabulary test in which he asked people to use words as well as define them.

*The Mill Hill Vocabulary Test* was originally constructed as a measure of the other component of *g*, identified by Spearman, namely *reproductive* ability – the ability to reproduce information and intellectual skills. The test turned out to have remarkable internal consistency, dispersion, reliability, and predictive validity to educational performance. As Spearman anticipated, compared with *educative* ability, reproductive ability turns out to have different genetic origins, be less affected by the environment, and have different implications for people's future lives and careers.

But the great value of the extended-answer form of the test in which people were asked to use words as well as define them was that it provided my father with an entree into the

---

## Scotland's Greatest Psychologist

study of the dis-organisation – and therefore organisation – of behaviour. It was possible to elucidate the co-ordinates of conduct: those required to attend to, and organise, the past, present, and future to clarify values and future goals and thereafter achieve them (Raven, 1956, 1962, 1966).

Failure to engage with the questions which reflection on these topics raise lies at the heart of psychology's inability to develop an appropriate framework for thinking about the nature of high-level competence and thus an appropriate psychometric framework.

The point may be illustrated from Barrett and Depinet's (1991) attack on McClelland's *Testing for Competence rather than Intelligence* (1973). Both the attack itself and the absence of an appropriate response stem from a failure to think through the issues.

Backtracking for a moment, my father's work with the Vocabulary test was not his first attempt to study values or motivational predispositions and the qualities required to undertake valued activities effectively. Much earlier, he had developed a projective test, *Controlled Projection* (Raven, 1944, 1951), in which children were encouraged to talk about their heroes and heroines, their likes and dislikes, and their hopes and fears, while drawing. The first edition sold well, perhaps because psychologists could exercise their imagination when interpreting the stories, but sales fell away when normative data were introduced into the second edition. Viewing what happened in the light of developments that have occurred in the interim, it would seem that the explanation may have been, not that having to compare responses with norms was off-putting, but that the scoring system was wrong.

As far as I can make out, McClelland succeeded where my father failed. But McClelland failed where father, approaching the problem via the Vocabulary test, succeeded.

McClelland's scoring system for his (projective) *Test of Imagination* (McClelland et al., 1958) first asks "What does the person who wrote these stories care about, what kinds of things does he or she value?" It then asks "In relation to those activities, *and only in relation to those activities*, does the individual think, make plans, persuade other people to help, turn his or her feelings into the task, anticipate the future, bring to bear relevant information and skills from the past, and persist over a long period of time? For each of these questions answered positively, score 1 point."

Note the two-stage scoring procedure. It does not make sense to ask a person who shows all sorts of creativity when putting people at ease to display that creativity with Lego bricks. Note the multiple, cognitive, affective, and conative, components of behaviour that are summed. Note the use of the past, the existential present, and the future. Note the emphasis on order and values. Note the cumulative – cross-competency – multiple regression like – nature of the scores. Note the problems for validation.

Next note that McClelland did not conduct his studies using conventional tests or develop his scoring system using conventional psychometric theory. He developed it by studying what changed as a result of experimental manipulation (starvation, sexual arousal, arousal of achievement motivation).

From what has been said it is clear that, although, so far as I know, he had no knowledge

---

## Scotland's Greatest Psychologist

---

of it, what McClelland had in fact done was operationalise the components of what my father termed "The co-ordinates of conduct". Further, going back to what was said earlier about the inadequacy of the framework most often deployed to think about and assess high-level competencies, it is obvious that McClelland had in practice confronted the dominant psychometric framework in psychology with another which was entirely incongruent with it but similar to that which one arrives at if one ponders the implications of father's Socratic mention of military intelligence.

Although McClelland never recognised the clash with classical psychometric assumptions that was embedded in his scoring system or the way in which what he had done operationalised my father's co-ordinates of conduct, it would seem that the insights developed here should leave us in a much stronger position to grapple with the McClelland-Barrett argument and to develop a psychometric model which will at last enable us to get a fix on all those elusive qualities – creativity, self-confidence, leadership, etc. – that have posed such problems for psychologists in the past (4).

In this article, I have attempted to take up Tommy's challenge to highlight ways in which my father's work engaged with contemporary problems in psychology. In the next article, Ralph Hetherington will explore the professional contributions he made to psychology via his Department, colleagues, and students.

### Notes

- 1 See Raven (1995) for an account of how this process actually operates with Headstart.
- 2 I have spelt out the implications of these

brief observations in a general framework for thinking about intelligence, and contrasted them with Gardner's formulations, in recent editions of the APM Section of the Manual (Raven, J.C., Raven, J. and Court, 1994/1998).

- 3 But see the General and APM Section of the Manual (Raven, J. et al., 1995; Raven, J.C. et al., 1994/1998) for discussion of the problems involved in validation.
- 4 The model of competence and its assessment to which this points is spelt out in Raven (1984).

### References

- Barrett, G.V. and Depinet, R.L. (1991). A reconsideration of testing for competence rather than intelligence. *American Psychologist*, 46(10), 1012-1024.
- Deary, I.J. (1993). Inspection time and WAIS-R IQ subtypes: A confirmatory factor analysis study. *Intelligence*, 17, 223-236.
- Deary, I.J. (1995). Auditory inspection time and intelligence: What is the direction of causation? *Development Psychology*, 31, 237-250.
- Flynn, J.R. (1984). The mean IQ of Americans: Massive gains 1932 to 1978. *Psychological Bulletin*, 95, 29-51.
- Flynn, J.R. (1987). Massive IQ gains in 14 nations: What IQ tests really measure. *Psychological Bulletin*, 101, 171-191.
- Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.
- Gardner, H. (1991). *Intelligence in Seven Phases*. Harvard Project Zero.
- Jencks, C., Smith, M., Acland, H., Bane, M.J., Cohen, D., Gintis, H., Heyns, B. and Michelson, S. (1973). *Inequality: A Reassessment of the Effect of Family and Schooling in America*. New York: Basic Books; London, England: Penguin Books.
- McClelland, D.C. (1973). *Testing for*

---

## *Scotland's Greatest Psychologist*

- competence rather than for "intelligence". *American Psychologist*, 28, 1-14.
- McClelland, D.C., Atkinson, J.W., Clark, R.A. and Lowell, E.L. (1958). Appendix. In J.W. Atkinson (Ed.), *Motives in Fantasy, Action and Society*. New York: Van Nostrand.
- Messick, S. (1989). Meaning and values in test validation: The science and ethics of assessment. *Educational Researcher*, 18(2), 5-11.
- Messick, S. (1995). Validity of psychological assessment. *American Psychologist*, 50(9), 741-749.
- Oakland, T. (1995). 44 country survey shows international test use patterns. *Psychology International*, 6(1), Winter, 7.
- Raven, J. (1984). *Competence in Modern Society: Its Identification, Development and Release*. Oxford, England: Oxford Psychologists Press.
- Raven, J. (1991). *The Tragic Illusion: Educational Testing*. New York: Trillium Press; Oxford, England: Oxford Psychologists Press.
- Raven, J. (1995). *The New Wealth of Nations: A New Enquiry into the Nature and Origins of the Wealth of Nations and the Societal Learning Arrangements Needed for a Sustainable Society*. New York: Royal Fireworks Press; Sudbury, Suffolk: Bloomfield Books.
- Raven, J., Raven, J.C. and Court, J.H. (1995). *Manual for Raven's Progressive Matrices and Vocabulary Scales. Section 1, General Overview*. Oxford, England: Oxford Psychologists Press; San Antonio, Texas: The Psychological Corporation.
- Raven, J.C. (1944, 1951). *Controlled Projection for Children*. First and Second Editions. London: H.K.Lewis.
- Raven, J.C. (1956). The principle of individuation and the co-ordinates of conduct. *British Journal of Psychology*, 47(2), 95-100.
- Raven, J.C. (1962). *Extended Guide to Using the Mill Hill Vocabulary Scale with the Progressive Matrices Scales*. London: H.K.Lewis.
- Raven, J.C. (1966). *Psychological Principles Appropriate to Social and Clinical Problems*. London, England: H.K. Lewis.
- Raven, J.C., Raven, J. and Court, J.H. (1994, 1998 update). *Manual for Raven's Progressive Matrices and Vocabulary Scales. Section 4, The Advanced Progressive Matrices*. Oxford, England: Oxford Psychologists Press; San Antonio, TX: The Psychological Corporation.
- Sperry, R.W. (1983). *Science and Moral Priority: Merging Mind, Brain, and Human Values*. Oxford: Blackwell.
- Styles, I. (1995). *Integrating Quantitative and Qualitative Approaches to the Study of Intelligence: The Relationship between the Algorithms of Raven's Progressive Matrices and Piagetian Stages*. Murdoch, Western Australia: Social Measurement Laboratory, Murdoch University.
- Trevarthen, C. (1990). Growth and education of the hemispheres. In C. Trevarthen (Ed.), *Brain, Circuits and Functions of the Mind: Essays in Honor of Roger W. Sperry*. Cambridge, England: Cambridge University Press.
- Vodegel-Matzen, L.B.L. (1994). *Performance on Raven's Progressive Matrices*. Ph.D. Thesis, University of Amsterdam.

# John Carlyle Raven

## (1902 – 1970)

Ralph Hetherington

John Carlyle Raven was a great original. He was no man's creature and he resisted any attempt to classify him, or to allocate him to any particular school of thought. William James's crab, when referred to as a crustacean, protested 'I am no such thing, I am myself, myself alone! (1). John Raven did likewise.

Originally trained in biology, a subject he taught in schools, he later turned to psychology, coming under the influence of Aveling at King's College, London and Spearman at University College, London. He joined Penrose's team at Colchester which was undertaking research into the genetics of mental deficiency. He had, by then, become interested in the application of Spearman's principles of education of relations and correlates, to the assessment of 'a person's capacity for coherent perception and orderly judgement.' Developing Spearman's ideas, he designed an intelligence test based on a series of matrix patterns of increasing difficulty. The publication of the standard series of such matrices in 1938 was timely for their further development, as they were then adopted by the armed services and government agencies for the selection of personnel during the war. By then he had joined the staff of the psychiatric section of the Mill Hill Emergency Hospital which was the wartime location of personnel from the Maudsley Hospital. This gave him an opportunity to develop his ideas, applying them to problems of clinical psychology. While he was there he met Mayer-Gross who was Director of Clinical Research at the Crichton Royal Institution at Dumfries. As a result, he was invited to join the staff of the Crichton as research psychologist. This he did in April 1943 and was given the task of preparing the ground for the setting up of a Department of Psychological Research in the hospital after the cessation of hostilities.

It is important to note that this was to be a research and not a clinical department, since its terms of reference were 'to study normal mental development, and abnormal conditions as far as these could be regarded as deviations from the normal and as such, assessed and correlated with ascertained organic conditions and social factors'(2). Raven maintained that the term 'clinical' meant 'pertaining to the sick bed' and as such was not of direct concern to psychological research. Thus, from the beginning he repudiated the medical model as being of any use to psychologists.

This ability to see things quite differently from most other people must have been, in some measure, due to his pranced dyslexia (3), although this syndrome was not recognised as such in those days. He was a most uncertain speller and relied hugely on his secretary Grace Laurie and on his wife Mary, to produce any written material. Raven would think aloud and have

---

## Scotland's Greatest Psychologist

everything he said taken down verbatim. He would then study the transcription and re-dictate revised versions until he had achieved something that was meaningful to others as well as to himself. His great difficulty with words did not seem to impair his ability to read and understand books, but rather his ability to communicate his own ideas. In this he was in good company. Faraday, Galton and Einstein were all dyslexic with similar difficulties in verbal communication. Galton has described his own problem thus (4):

It is ...a serious drawback to me in writing, and still more in explaining myself, that I do not easily think in words as otherwise. It often happens that after being hard at work, and having arrived at results that are perfectly clear and satisfactory to myself, when I try to express them in language I feel I must begin by putting myself on another intellectual plane. I have to translate my thoughts into a language that does not run very evenly with them. I therefore waste a vast deal of time in seeking for appropriate words and phrases, and I am conscious, when required to speak on a sudden, of being very obscure through mere verbal maladroitness, and not through want of clearness of perception.

This passage might have been referring to Raven himself. When he was trying to explain some new idea or concept, he would usually resort to drawing a diagram. Some of these would be simple, perhaps two lines crossing diagonally; others would be extremely complicated and even three dimensional (5). His theoretical framework has not, however, been greatly influential in the development of psychological theory in general, but it did have an important influence in the development of clinical psychology. This influence was not only due to Raven's originality, but also to the historical setting of his work.

In the early days, clinical psychology in Britain was polarised by two strongly contrasted theoretical viewpoints, one psychoanalytical and the other hypothetico-deductive, the former held by the Tavistock Clinic and the latter by the Department of Psychology at the Institute of Psychiatry at the Maudsley Hospital. These two, both in London, together with the Crichton Royal in Dumfries, were the only places teaching clinical psychologists in the late 1940's and early 1950's. Such psychological work in the adult clinical field as there was before this, was largely psychodynamic with a little mental testing thrown in. There had, of course also been pioneer work in educational psychology with children. Between the two world wars, clinical psychology had almost all been experimental in the field of adult mental health, and with children had taken the form of child guidance (6). When Eysenck published his book *Dimensions of Personality* (7) a scientific approach to clinical psychology was firmly established. Between the Maudsley and the Tavistock, however, there was little love lost, especially after Eysenck had delivered his onslaught on the efficacy of psychotherapy (8) and members of his Department had finished savaging the Rorschach Test (9).

John Raven, at the Crichton Royal, was thus in a position to provide an alternative to these two well entrenched and embattled positions, producing a viable approach which was different from both, offering an attractive alternative which avoided the reductionism of the Maudsley and what some would call the 'unscientific' speculations of the Tavistock Clinic. Well trained and experienced in strict psychometric and statistical techniques, Raven was no stranger to



---

## *Scotland's Greatest Psychologist*

---

natural science and to the demands made by scientific rigour. At the same time he was interested in the dynamic and emotional relationships that develop between interacting individuals. In his book *Human Nature*, published in 1952 (10), he wrote:

Under some circumstances people appear to be immediately aware of the affections, experiences, thoughts, hopes and intentions of another person. For this reason people will sometimes speak of telepathy between them, or of some kind of religious experience, as a result of which the experience they share seems in some way more than the experience of either person considered separately.

This metaphysical approach to personal relationships set Raven apart from other clinical psychologists of that period, and he was looked upon, in some ways, as a bit of an oddity. However, Raven seemed to manage to produce the sort of goods that psychologists wanted, such as the Matrices Test, and a viable and valued training course at the Crichton, so that he could be excused his eccentricities. Those of us who worked with him, however, soon began to realise what a gross underestimate this was of Raven's original and fruitful ideas. He was little influenced by the various psychological fads and fashions that came and went.

Raven's views about the role of the clinical psychologist were set out in an early paper of his in 1950 (11), in which he wrote:

It is not the clinical psychologist's function to put other people right, either by treating them therapeutically or by fitting them into appropriate social situations. By trying to understand people we also change them; at the same time, if we try to change people or even think their conduct is pathological, we are less likely to understand them. For this reason a clinical psychologist who desires not only to understand people but also to alter them is not only in danger of being pretentious; as a psychologist he is less likely to become successful.

Two years after he retired, Raven published a book (12) in which he returned once again to his views on the role of the clinical psychologist.

What I regret is the desire among some psychologists to alter people in order to put them right. Who is to say what is right and how other people should be put right? After all, this is a kind of aggression, isn't it? A form of self-assertion that I am right and that other people need to be put right. This I think does happen and is extremely regrettable. If you think others are wrong, you are not going to understand them. To understand people the important thing is for them to be able to be themselves, and what the psychologist can do is to help them know and be themselves.

Between them, these two passages set out admirably the basis of Raven's views on the role of the clinical psychologist. Thus the first task of the psychologist was to achieve an understanding, not only of the patient's difficulties, their nature and aetiology, but also to understand the patient's views about his or her own future, aspirations and self-image. There had to be a complete acceptance of the patient in his or her own right, undiagnosed, unclassified,

---

## Scotland's Greatest Psychologist

autonomous and self-determining. This was the only way that some sort of understanding could be achieved.

All this was a far cry from the other clinical approaches at that time. These were that the patient's behaviour had to be studied either by interpretation in the light of a well-established psychoanalytical theory, as at the Tavistock Clinic, or by devising experimental procedures in order to answer psychiatrists' questions about patients, as at the Maudsley.

Since then, of course, other clinical theories and methods have developed, many of them imported from the United States. In the early days, however, Raven's influence was important, introducing a third force in the development of clinical psychology which, while repudiating the medical model, avoided scientific reductionism on the one hand and doctrinaire interpretation on the other.

### Notes and references

- 1 This delightful idea, so typical of William James, is to be found on page 10 of his monumental *Varieties of Religious Experience* (1902).
- 2 These terms of reference are frequently referred to in Raven's writings, and may be found on page 3 of his *Psychological Principles Appropriate to Social and Clinical Problems* (1966).
- 3 Dyslexia may be summarised as 'difficulties encountered by non-verbal thinkers in a verbal culture'. This definition would apply exactly to Raven.
- 4 T.G. West (1991), *The Mind's Eye*, p179.
- 5 Raven's diagrams are of great interest, especially to students of dyslexia. A number of them have been published in the appendix of his 1966 book, cited above, pp171-180, in which he describes how he thinks without words but rather in terms of locations and directions, tensions and concentrations.
- 6 L.S. Hearnshaw (1964), *A Short History of British Psychology*, pp282-289.
- 7 H.J. Eysenck (1947) *Dimensions of Personality*.
- 8 H.J. Eysenck (1952) *Journal of Consulting Psychology*, 16, 319-324.
- 9 H.B. Gibson (1981) *Hans Eysenck: The Man and His Work*, p85.
- 10 J.C. Raven (1952) *Human Nature*, p151.
- 11 J.C. Raven (1950) *BPS Bulletin*, 1, 282-285.
- 12 J.C. Raven (1966) *op. cit.*, pxvii.

I should like to thank Dr John Raven, Dr Gordon Bevans, Mr Morris Cunningham and Dr John Orme for their help in the preparation of this article. My daughter Julia Hetherington, who works with dyslexic university students, has supplied me with a modern definition of dyslexia (note 3, above).

*Dr Ralph Hetherington is a former President of the British Psychological Society*