



R. B. BRAITHWAITE

Edward Leigh

At King's Braithwaite read for the Mathematics and Moral Sciences Triposes (the latter now known simply as 'Philosophy', but formerly named, following J. S. Mill, to distinguish it from the Natural Sciences).

Richard Bevan Braithwaite 1900–1990

RICHARD BEVAN BRAITHWAITE was born in Cumbria on 15 January 1900, the son of William Charles Braithwaite of Banbury, and he died on 21 April 1990. He was educated at Sidcot School, Somerset, and Bootham School, York, and entered King's College Cambridge in 1919 as a Scholar. He was elected Fellow of King's in 1924 and remained a Fellow, and resident in Cambridge, all his life. He became University Lecturer in Moral Science in 1928, with the title Sidgwick Lecturer in Moral Science from 1934. In 1953 he became Knightbridge Professor of Moral Philosophy in succession to C. D. Broad, retiring from this chair in 1967. He was elected Fellow of the British Academy in 1957. He held terms as President of the Mind Association, the Aristotelian Society and the British Society for the Philosophy of Science, and gave the Turner Lectures at Trinity College Cambridge in 1945–6, the Philosophical Lecture (Henriette Hertz Trust) to the British Academy in 1950, and the Forwood Lecture in Liverpool University in 1968. His academic activities abroad began with the Deems Lectureship at New York University in 1962, followed by Visiting Professorships at Johns Hopkins, the University of Western Ontario, and the City University of New York. He was a Foreign Honorary Member of the American Academy of Arts and Sciences.

He married, in 1925, Dorothea Cotter Morison, daughter of Sir Theodore Morison; she died in 1928. In 1932 he married Margaret Masterman, daughter of the Rt. Hon. C. F. G. Masterman, a noted Liberal MP, who had been a member of Asquith's Cabinet of 1914. Richard and Margaret had a son and a daughter; Margaret predeceased him in 1986. For many years he and Margaret were well-known for their hospitality to and encouragement of young scholars and scientists at their home in Millington Road, Cambridge, and at reading party 'retreats' in the Mill at Burnham Overy Staithe, Norfolk.

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An early and most significant friendship was with Frank Ramsey, son of the then President of Magdalene and brother of Michael, later Archbishop of Canterbury. Ramsey was three years his junior, but Richard was never stinting in his acknowledgment of what he had learned in philosophy from his friend, who tragically died in 1930 at the age of 26. In his obituary in the *Cambridge Review* Richard wrote 'to at least one of his friends his death is as if a lighthouse were extinguished and we were left to grope our ways in the dark'. In 1931 Richard edited a selection of Ramsey's papers in *The Foundations of Mathematics and other logical essays*, a volume which proved to be seminal for his own and many other philosophers' thinking about mathematical and philosophical logic, probability, causality, and the nature of scientific theories.

In Cambridge the 1920s were a time of philosophical excitement, which Braithwaite later described in a chapter on 'Philosophy' in *University Studies Cambridge 1933*. Russell had left Trinity College in 1916, but his 'scientific' philosophizing was still influential in lectures, partly through the criticisms of G. E. Moore and W. E. Johnson. Moore's own philosophy was the other prominent feature of teaching in the Faculty. Braithwaite was more scientifically and mathematically oriented than Moore, but he remained his disciple to the extent that he believed that philosophers of science should disregard all sceptical doubts about common-sense observation statements, and devote themselves to the analysis, in something like Moore's sense, of scientific assertions made on the basis of observational evidence.

In his second Summer Vacation in 1921, Braithwaite read Keynes' recently published *Treatise on Probability*, and in his obituary of Keynes he recalls 'the excitement with which I read it that Long Vacation, and my horror, on returning to Cambridge, at finding that F. P. Ramsey had not been convinced by every word of it'. For several years Braithwaite upheld the inverse probability theories of the Cambridge trio Keynes, Jeffreys and Broad, and only defected when finally persuaded by Ramsey's critique which was first published in Braithwaite's posthumous edition. But he continued to enjoy Keynes' friendship and encouragement, and it was Keynes' influence that first caused him to think seriously about the logic of science.

Other luminaries who dominated Braithwaite's early Cambridge days were Whitehead, Eddington and Wittgenstein. Braithwaite recognized the importance of Whitehead's books on the philosophy of physics, where critical expositions and reconstructions are given of the 'new physics': primarily the theory of relativity. He appreciated Whitehead's emphasis on constructive definitions of concepts in terms of observability, including his attempt to define space-time points in a continuum by means of the

'method of extensive abstraction'. But when he comes to review *Science and the Modern World*, published after Whitehead had departed for Harvard, Braithwaite regrets that this has turned out to be cultural history of science rather than a definitive metaphysical study based on the previous analyses of physical theory. Whitehead has succumbed to speculation devoid of cogent reasoning. Braithwaite has more complimentary things to say about Eddington, whose Gifford Lectures *The Nature of the Physical World* (1929), he describes as 'one of the most important works (philosophical as well as scientific) that has appeared for many years'. This was because Eddington's successful exposition of the complexities of recent physics addressed the 'menace to civilization' arising from the contemporary gulf between scientific and common knowledge. A decade later, reviewing Eddington's *Philosophy of Physical Science*, Braithwaite makes a serious attempt to elucidate Eddington's by then highly controversial attempt to derive physics from *a priori* algebraic principles—a type of 'speculation' which, though probably invalid, appealed to Braithwaite more than did Whitehead's metaphysical flights.

In the *University Studies* article, however, it is interesting to find Braithwaite devoting far more space to Wittgenstein than to any other contemporary Cambridge philosopher. He was not later to be numbered among the disciples of Wittgenstein, but in 1933, on the basis mainly of the *Tractatus*, he recognized a kindred spirit, devoted to exact statement and an epistemology of observation. Wittgenstein's later repudiation of the *Tractatus* doctrine did not diminish Braithwaite's regard. Wittgenstein and Moore are singled out in his *Scientific Explanation* in 1953 as the unique influences on his subsequent philosophizing. And in the '60s I vividly remember his passionate declaration, in a Senate-House debate on the criteria for a Ph.D., that only Wittgenstein in this century could be said to have made an original contribution to philosophy!

Early in his career Braithwaite several times mentioned the benefits deriving from the small size of the Moral Science Faculty, in promoting close and continuous philosophical debate. But, like most academics of his generation, he lived through a time of great expansion of the Faculty, and indeed of the University. He was always active in University affairs, being at various times a member of the General Board of the Faculties and the Council of the Senate, and being a Syndic of the University Press for an unusually long stretch of 19 years. His interest in building bridges between the sciences and humanities led him in the '30s to join a group including Joseph Needham and Herbert Butterfield in arranging series of public lectures in science and its history and philosophy. He was one of those who were instrumental, during the 1950s, in establishing History and Philosophy of Science as a subject in the Natural Science Tripos (in spite

of the reservations of some scientists). This initiative has grown into an independent Department, which is now the largest such Department in the country and one of the largest in the world.

Braithwaite's intellectual biography falls into three parts. First were many pre-war publications on topics of contemporary philosophical interest: perception, sense data, particulars and universals, and philosophy of the new physics. Second was his development of a distinctive and systematic philosophy of science, including new problems about theoretical concepts, deductive and statistical explanation, as well as the old ones about induction and the nature of probability and causality. Third was his moral philosophy, which with tongue slightly in cheek, he used to say he felt obliged to pursue particularly after he was appointed to the Knightbridge Chair of *Moral Philosophy* in 1953.

During the 1920s and '30s Braithwaite appeared almost every year as a speaker at Aristotelian Society meetings and in the pages of *Mind*, often debating with his philosophical peers Russell, Moore, Ramsey, Ryle, Waismann, and Stebbing, and the physicists Eddington, Jeans and Whittaker. Braithwaite's distinctive empirical, no-nonsense, anti-speculative approach is evident throughout: he always prefers formal and pragmatic solutions to the perennial problems. Following Ramsey, he begins to develop a pragmatic theory of belief in terms of action and preference, and adopts essentially Humean theories of causality and universals. He states his position on phenomenalism in terms of a theory of the meaning of propositions about material objects, and liberalizes the verification principle to take account of the incorporation of propositions into a corpus of knowledge by empirical (scientific) methods.

The influence of science on his philosophy is already pervasive. After initial hesitation he accepted that quantum theory shows that basic laws are irreducibly statistical, and this is of fundamental importance because it affects not only our view of ontology, but also the received analysis of meaning in terms of criteria of verifiability and falsifiability. Statistical hypotheses for potentially infinite populations can be neither verified nor falsified, but rules can be given for acceptance or rejection at given levels of significance. These rules introduce pragmatic value-judgments into the theory of meaning, but are nevertheless quite sufficiently workable for an adequate theory of meaning as use. As for the much-canvassed consequences of quantum theory for the freewill problem, Braithwaite remains conservative. It is untrue to say that quantum theory is incompatible with prediction, since it can predict macro-events with high probabilities amounting to certainty (he here neglects the cases, familiar since Schrodinger's cat, in which single micro-events are irreducibly undetermined, and yet may trigger off subsequent macro-events which share their

indeterminacy). Braithwaite never wrote at length on freedom, but his view may be gleaned from several asides: the prediction of human action is more difficult than that of natural events, but a science of psychology (possibly with statistical laws) is in principle possible. Even if these laws are determinist, the concept of moral responsibility is not impugned: 'as for the pure philosophical freedom of the will . . . my will is as free as I feel it to be, and that is the end of the matter'.

Throughout the early papers a distinctive view of the relation between philosophy, philosophy of science, psychology and science emerges. Ontology in the sense of what materially exists is a wholly empirical question, that is, a question for science. For example, philosophers have no business discussing world lines, entropy, the existence of an infinite time-sequence, memory, etc. independently of the relevant sciences. On the other hand psychology as a science is incompetent to solve the specific philosophical problems of meaning, knowledge, and belief. In a debate with Russell in 1938, Braithwaite rejects Russell's psychological theory of incorrigible basic propositions, and his causal theory of meaning in favour of a theory of linguistic rules. In this sense naturalism is a heresy: 'it should be the task of logicians by taking account of the right *linguistic* (my italics) considerations, to strengthen Philosophy against the onslaught of the infidel psychologists'. And in another sense naturalism is false, since questions of human intention and value-judgment fall outside it; a view which he develops in a most original way in the next phase of his work.

During the 1940s Braithwaite was drawn more deeply into philosophy of science, away from direct concern with the general issues on which he had cut his philosophical teeth. Philosophy of science appealed not only to his interest in exciting new scientific developments, but also to his mathematical and logical training, for he found there problems susceptible of definite constructive solutions.

The '60s were a time of radical change in many things, including the philosophy of science. Braithwaite's major book *Scientific Explanation*, though not published till 1953, was based on Tarner Lectures of 1946. His views were therefore moulded long before the revolutionary work of Kuhn and Feyerabend, and in a sense he may be said, like Moses, to have led his readers to a watershed, but not to have occupied the promised land. The chief presupposition that differentiated his approach from that of his successors arose from his attitude to scientific language. He considered that philosophy of science should not concern itself with the fundamental epistemological problems of perception, meaning and truth, but should accept the truth of common-sense observational propositions and the plain meaning of the language in which they are expressed. However, he forestalled many of the theses that later came to be accepted orthodoxy,

and for recruits to the profession like myself in the late '50s, he provided a clear and rigorous account of the nature of scientific theories which prepared us for a sympathetic but critical approach to the new philosophy when it arrived.

The topics treated in *Scientific Explanation* constitute the first systematic work in English to take account of the modifications to positivist philosophy that had been forced upon empiricist philosophers principally by the new physics (Popper's *Logic of Scientific Discovery* was not published in English until 1959). The 'problem of theoretical terms' arose because for positivism meaningful hypotheses were restricted to what could be directly observed or constructed out of observation. This doctrine could not be maintained in the face of developments such as the physics and chemistry of the micro-world, the cosmology of the distant past, and even the beginnings of molecular biology. Braithwaite joined those originally influenced by the Vienna Circle, such as Carnap, Popper, Hempel and Nagel, in proposing a 'hypothetico-deductive' analysis of the structure of scientific theory.

According to this analysis, sets of hypotheses containing 'unobservable concepts' are meaningful and acceptable in science if their deductive (or statistical) consequences, together with some interpretation into observable terms, yield laws and particular predictions that are confirmed by experiment. Conversely, as Popper in particular insisted, they must yield consequences that are capable of being falsified by experiment if the hypotheses are false, thus excluding trivial hypotheses which cannot lead either positively or negatively to an increase of knowledge. Sets of hypotheses satisfying these conditions were said to be explanatory—to be actual explanations if true, and potential explanations if not yet known to be true or to be false (the latter of course being the usual situation). Where conflicting potential explanations are present, criteria of simplicity in its many senses come into play. Braithwaite followed Ramsey in pointing out that theoretical terms satisfying these conditions are not only meaningfully empirical, but are necessary to science if theories are to be comprehensive and predictive in other than trivial senses.

So much was generally agreed in the 1950s. Two principal difficulties remained: first, what is the status of the 'picture' or 'model' language unselfconsciously used by scientists when talking of atoms, electrons, waves, curved spaces, genes and so on; and second, can 'reality' be ascribed to such concepts in the same sense as applies to observables? Braithwaite had more to say about the status of 'models' for theories than his contemporaries. He showed by means of ingenious examples that all that was strictly *necessary* for theories was a formal 'calculus' embodying the hypotheses about unobservables, together with an interpretation and

deduction of observable laws and particulars. But he recognized that interpretation of the unobservables themselves into models (particles, waves . . .) was heuristically necessary for thinking about the theory, checking its internal consistency, and suggesting further developments. He maintained, however, a sharp distinction between model and theoretical calculus, and consequently between the 'theoretical' and 'observational' languages. An important consequence was his unwillingness to contemplate the 'reality' of theoretical objects: to ask whether 'electrons' exist is effectively to ask whether there is a term in a formal calculus which, together with deduction and interpretation, yields the experimental statements commonly associated with the behaviour of 'electrons'. The model-particle with its mass, charge, position, etc. has at best a relation of isomorphism to the calculus, that is it is an interpretation alternative to that of the theory of micro-physics, and is not that theory itself.

Such an analysis has always raised protests from realistically-minded scientists, and it was fatally undermined by the growing recognition in the 1960s that its basic presupposition, the dichotomy between theoretical and observation languages, cannot be maintained. The work of historians of science, and particularly of Kuhn and Feyerabend, showed that 'observation' statements are often couched in terms of the currently acceptable theories (they are 'theory-laden'), and that there is a seamless network of hypotheses making up any complex theory, in which no *a priori* 'theoretical' and 'observational' parts can be discriminated. This finding has subsequently revived a fashion for 'realism' among philosophers of science, which, it must be said, sometimes results in neglect of the cogent critical points made by Braithwaite and others, about the dangers of taking model talk too literally.

Braithwaite was an anti-realist also in another sense. He maintained an essentially Humean view of scientific laws, and had no belief in causes as a modality other than empirical. In his book he replies to the standard objection that laws imply counterfactual consequences (a brakeless train *would* run away, but there are no brakeless trains). Without such consequences laws reduce to accidental generalizations of fact. He was one of the first to argue that the deductive analysis of theory can be applied to the solution of this problem. Laws are consequences of systematic, comprehensive and predictive theories having relatively simple and powerful theoretical premises. What we call accidental generalizations do not follow from such theories, but are supported only by factual regularities which suggest no theoretical reason for a lawlike status. To the reply that, in this case, the theoretical premises themselves are 'mere accidental generalizations', Braithwaite replies with simple piety that that is how the world is made. There are deep and generalizable regularities that scientists

discover; nothing is added by saying that they discover 'causes' in a more than factual sense. Explanation in a deductive system is sufficient to answer both the How and the Why questions about how nature works.

The deductive analysis of explanation for the physical sciences was extended in Braithwaite's Presidential Address to the Aristotelian Society in 1946 to the biological sciences, to yield a theory of teleological explanation. Biologists frequently use concepts of function or goal-directedness, making *prima facie* reference to the future, in areas where there is no conscious intentionality. Does this imply an invalid importation of teleology into science? It is true that many of these references have been explained in orthodox physico-chemical terms, as in the theory of natural selection or by describing mechanisms involving feedback. But Braithwaite seeks an approach to teleology without assuming that all cases will be reduced to physical laws 'one day'. He suggests that the crucial factor distinguishing valid teleology from illicit postulation of vital forces and intentionality, is the *plasticity* of goal-directed behaviour, that is, it reaches the goal under a wide variety of causal circumstances. Even where this is not (yet) explained by causal mechanisms, the use of hypotheses about plasticity and tendency, for example in relation to bird migration or human memory, is quite valid. If placed in the context of a systematic deductive theory, it constitutes a distinct kind of explanation in terms of 'biotic laws'. Hence biologists need not surrender their methodological independence to the physicists.

Major preoccupations throughout Braithwaite's philosophical life were the status and justification of probability statements, and of statistical hypotheses in science. He was one of the first philosophers to take advantage of the newly sophisticated methods of Neyman-Pearson in choice of statistical hypotheses, and of Wald and von Neumann in decision theory and the theory of games. Braithwaite was well prepared for these developments by his early adoption of Ramsey's theory of betting rates as measures of an ideal gambler's degree of belief in a proposition, and he spent much energy thereafter in relating this conception of probability with the other concept of probability as chance or frequency.

He also put the decision-theoretic approach to good use in discussing the problem of induction. He never claimed to have anything new to say about the classic problem, indeed he believed there was no 'solution' without reducing induction to deduction, and that would be a logical mistake. What can be done is to elucidate inductive *behaviour*, and this he did by applying the principles of the theory of games. In inductive situations we have to act under uncertainty, and we can regard ourselves as playing a 'game against Nature'. Faced with a choice between accepting or rejecting a hypothesis, we consider the four possible outcomes of

accepting/rejecting in the cases that the hypothesis is true/false. We then decide what are our *preferences (utilities or values)* amongst the possible outcomes, and act to maximize the outcome-value as far as possible, whether the hypothesis is in fact true or false. Thus value-judgments as well as the calculation of possible factual outcomes are involved in deciding how to act rationally. Even in science value judgments are required: Braithwaite does not believe 'that there is an impassible frontier between pure science and its practical application', and its practical application always requires action under more or less uncertainty—a game against Nature. Inductive inference is a problem not of logic but of decision, and the various aspects of its old 'logic' can be discussed pragmatically in these terms.

It is a basic theorem of decision theory that one cannot simply calculate back from the actions of another person to how that person ordered their preferences or their degrees of belief (betting rates) in a set of hypotheses. Thus the pragmatist's aim simply to reduce 'hidden' beliefs to behaviour is doomed to fail. Braithwaite fully accepted this result, but in his very last substantial paper in 1973 he was still engaged in trying to modify the pragmatists' programme to give a quasi-behavioural theory of belief in which beliefs and value-judgments are independent determinants of action.

In his analysis of moral judgment, however, the approach to induction via the theory of games did provide him with a model, as he makes clear in the first account of his highly original theory in the Philosophical Lecture of 1950, entitled 'Moral Principles and Inductive Policies'. Here he states his belief (probably with some contemporary linguistic philosophy in mind) that 'the principles of the good life are more important than those of ethical conversation', and are concerned with how to exercise practical reason, just as inductive policies are concerned with the application of factual beliefs. Not all policies for inductive application can be 'justified', nor can all moral beliefs, but moral philosophy is more concerned with action than with the attempt to justify propositions.

Braithwaite's mature account of moral practice is to be found in his Inaugural Lecture in Cambridge which was published as *Theory of Games as a Tool for the Moral Philosopher* in 1955. Here the problem is that of people who have different and incomparable ends which will result in different preferences in deciding actions. In spite of this he shows how it is possible to collaborate in acting rationally by the application of the same principles as in a fair 'game': principles of equitable distribution, fairness, prudence, and in general the desire to maximize social goals. The concept of a 'game against Nature' is replaced by a game between two individuals whose beliefs and preferences differ, but who still may find principles for

agreement upon action that gives each of them some, but possibly not complete, satisfaction.

Braithwaite's example is that of two musicians living in the same house which lacks sound proofing. One is a classical pianist and the other a jazz trumpeter, and both have to practice between 9 and 10 in the evening. Each would ideally like to play seven days a week with silence from the other, but they agree to collaborate to provide 'fair' satisfaction for each. Luke prefers to play alone, but he also quite likes to hear Matthew when he is not playing himself, and he prefers Matthew's silence when he himself is playing. Matthew on the other hand quite likes the accompaniment of a piano when he is playing, but loathes classical music by itself and prefers silence when he is not playing. If a numerical scale can be assigned to preference orderings of this kind, the theory shows how they can come to a fair division of time. The calculations can be extended to the case of a Matthew who, from pure malice, prefers to annoy by playing whenever Luke does, even though he gets no enjoyment one way or the other from playing his trumpet alone. Thus equitable division can apply even to 'unethical' but perhaps more realistic attitudes. The set-up is reminiscent (as Braithwaite points out) of 'conciliation' in industrial disputes, rather than the unreasonable emotions and prejudices typical of real moral conflicts. In true Enlightenment fashion, as was said about Condorcet, Braithwaite aspires to 'elucidate the moral and political sciences by the flame of algebra'; to go further would be to enter the province of psychology or religion.

Braithwaite wrote little directly on religion, but it was nevertheless a central intellectual and practical concern, of which he gave evidence in many lively and chaotic discussions with groups at the Norfolk Mill. He never suffered professional philosophical fools gladly, but in the company of sincere seekers after truth he was patience itself. He had been brought up a Quaker, and after a period of agnosticism he was received into the Church of England, though without being able to recite the Creed. For philosophical reasons, as he explained, he could not preface the credal statements with the declaration 'I believe' (the new-fashioned 'We believe' was presumably fraught with even worse philosophical difficulties). Nevertheless many must have been encouraged by his stringent and somewhat whimsical, but still deep and genuine, religious faith.

In his Eddington Lecture of 1955, *An Empiricist's View of the Nature of Religious Belief*, he made a classic statement of his religious position; one which found an echo in the thinking of many sceptical would-be believers. He starts with the empiricist's fundamental problem of the *meaning* of belief statements. Scientific beliefs are given meaning by accepted scientific methods which, as he has shown in relation to statistical

hypotheses and induction in general, are closely related to the *use* to which the beliefs are put. Moral beliefs are not subject to the same criteria of verification, but criteria of use are still relevant to their meaning. What about the meaning of religious beliefs? Braithwaite continues to regard as meaningless statements that are supposed to be about entities and events that transcend nature. No verification can possibly be relevant, for example, to 'God created the universe'. In any case, *nothing* lies outside the universe, consequently such a statement cannot be given understandable meaning.

His God is therefore at best an immanent God. He does not, however, pursue the pantheistic possibilities of this suggestion (which he probably considered as unverifiable as any transcendental claims). Instead, he compares religious beliefs to moral beliefs, and replaces verifiability with moral use. To say that Richard has a religious belief is to say that he adopts a certain (verifiable) moral attitude; in his case what he calls the *agapeistic* attitude of universal Christian love. Such an attitude is reinforced in life and action by 'telling the Christian stories'. These do not have to refer to historical or other facts to perform their function—Bunyan's *Pilgrim's Progress*, and Dostoevsky's novels perform it equally well. Contemplation of stories has a causal and psychological relation to action without the need to 'believe'—we act 'as if' they were true.

The theory depends for its plausibility on the empiricist presuppositions that only statements of fact, general hypotheses or logical truths can be 'believed', and that statements that can be believed are essentially plain literal expressions. The latter presupposition underlies Braithwaite's acceptance of observation statements at literal face value, an assumption that has been questioned even in philosophy of science. For example, one should not reject a statement such as 'God created the universe' *simply* on the ground that the 'universe' is all that there is and nothing can lie outside it. 'Universe' is in some sense a polyvocal or metaphorical term, as are all the distinctive terms in a religious language. On the other hand, it cannot be said that more recent understanding of the metaphorical character of scientific language has gone much further than Braithwaite in elucidating the meaning and justification of religious language. Braithwaite is in fact in a venerable tradition of negative theology for which 'God' is not an entity among other entities, and in which he cannot strictly be ascribed any properties at all in human language. Aquinas would have appreciated *An Empiricist's View of the Nature of Religious Belief*, although he could not have totally agreed with it.

All his life Braithwaite retained a sturdy independence of philosophical schools and fashions. Thus his memorial is not so much a 'Cambridge school' as an increasing number of philosophers, many of them his friends

and associates, who share his passionate concern to understand both the human and the natural, specially in a world dominated intellectually and practically by the power of science. In an early writing he described the right objective of the study of philosophy as 'the relief of the sort of indigestion which we feel when we seriously meditate upon our thinking . . . The aim of philosophy is the clarification of thought'. It was an aim he pursued with consistency and passion. Near his 80th birthday he thoroughly enjoyed a party with his friends and colleagues to celebrate the publication of a Festschrift *Science, Belief and Behaviour* (edited by D. H. Mellor). For several years thereafter he was still to be seen in seminars, ostensibly asleep during the speaker's paper, but then astonishing colleagues and students of younger generations with his powerfully expressed and cogently argued contributions to the discussion, irreverently scornful of fudge, pretentiousness and unclarity to the end.

MARY HESSE

Fellow of the Academy

Note. I am grateful to Hugh Mellor for his assistance with this Memoir.