Common sense, wa hae

The Triumph of Truth *by Joshua Reynolds, 1774. The figure on the right portrays James Beattie (1735-1803) holding his* Essay on Truth. *The Angel of Justice is thrusting down the head of Voltaire. The head in the foreground was believed by David Hume to be his; that in the left corner was said to be of Edward Gibbon.*

Scottish Philosophy and British Physics, 1750–1880: A Study in the Foundations of the Victorian Scientific Style. By Richard Olson. Pp. vii+349. (Princeton University: Princeton, New Jersey, and London, August 1975.) £9.20.

"WHERE we try to find models or analogies, they are quite content with laws", so wrote H. G. J. Moseley in his diary for June 1914 after meeting the French physicist Urbain. And if "pictorial thinking" has been a major and distinguishing characteristic of British physics, it is tempting to speculate on how it came about. The interesting thesis of Dr Olson is that it started with the 18th century Philosophical Society of Aberdeen (also known as the Wise Club) whose two most influential members were Thomas Reid, Professor of Philosophy at King's College, and James Beattie, Professor of Moral Philosophy at Marischal College.

The Society was the cradle of Scottish Common Sense Philosophy, so little known today that it has no mention in Bertrand Russell's *History of Western Philosophy*. It arose as a reaction against the atheistic scepticism of David Hume (to whom in fact it owed a good deal) and the materialism of thinkers such as Voltaire and Joseph Priestley. The Aberdeen group, in their efforts to defend moderate Scottish Presbyterianism against the rationalist challenge, had encountered the difficulty that many of us currently face in battling with the prospect of anarchy based on specious rationalism: the latter can lead to conclusions which in Reid's words contradict "certain principles which the constitution of our nature leads us to believe, and which we are under a necessity to take for granted in the common concerns of life". These are moral principles which can be no more proved than the axioms of Euclid and yet which are correspondingly essential as the foundations for a framework of morality.

This seems to be a remote base from which to trace the rise of pictorial thinking in British physics, but it is what Dr Olson sets out to do:

> "The basic aim of this book is to present and to establish the probability of a hypothesis regarding the development of the exact sciences—that is, that many of the important characteristics of the exact sciences in Scotland, and subsequently throughout Britain can be accounted for by the fact that Scottish scientists adopted a particular set of methodological and epistemological attitudes which were clearly articulated by a group of moral philosophers collectively known as the Common Sense School".

Perhaps the most suggestive argument is that with its reliance on common sense plus a few moral axioms, Scottish philosophy had greater faith in the pure "geometry of visibles", proving results by Euclidean arguments, than in analysis, where the algebra of infinite series was known to be dangerous, and where some of the entities such as the square root of minus one had no common-sense physical interpretation. Certainly, there was strong interaction in the Scottish universities between the moral and the natural philosophers (Beattie was in fact appointed to the Chair of Natural Philosophy but exchanged it the same day for that in Moral Philosophy) and undergraduates were exposed to both influences in the traditional Scottish degree.

And there was plenty of good teaching to be had: Reid held with Bacon that the stages of human knowledge were "like steps of a ladder" in which it would be "fruitless to skip directly from bottom to top"—a lesson often ignored today with disastrous results in school teaching. We find John Playfair distinguishing between hypothesis and theory:

> "Hypotheses are explanations which have no evidence independent of their ability to account for the phenomena in question while theories are founded on facts known independently of the phenomena to be accounted for".

And William Hamilton extended Occam's Razor into the Principle of Parsimony:

> "neither *more* nor *more onerous* causes are to be assumed than are necessary to account for the phenomena".

Again, Hamilton spoke of

> "the highest faculty of the mind—that of tracing the analogy of unconnected observations of evolving from the multitude of particular facts a common principle, the detection of which might recall them from confusion to system, from incomprehensibility to science".

Hamilton's colleague at Edinburgh, J. D. Forbes (of the bar and glaciers, and the Chair of Natural Philosophy) wrote

> "The importance of analogies in science has not, perhaps, been sufficiently insisted upon by writers on the methods of philosophizing. A clear perception of connexion has been by far the most fertile source of discovery".

Dr Olson ascribes the demise of the Scottish common-sense tradition to Forbes because his advocacy of greater specialisation in science at the undergraduate stage dethroned moral philosophy from its paramount place in Scottish education. But he as well as Hamilton influenced their pupil, Clerk Maxwell, who all through his life was fascinated by analogy—for example asking the question in a postgraduate essay "Are there real analogies in nature?", and repeatedly stressing the fruitful function of analogy throughout his papers and addresses. As a