

astronomical observations. Paul Feysabend has accused Galileo of faking these and other reports, and certainly the matter is far from straightforward. Although the experts (Righini and Gingerich) disagree, there seems a consensus that it was more a matter of a combination of genuine difficulties, haste and wilfulness than a deliberate or serious deception. Other Galilean topics include an identification by A. C. Crombie of the textbooks from which Galileo derived his early Aristotelian ideas; and a scholars' debate, perhaps unresolvable, on the interpretation of manuscripts purporting to record early experiments on free fall.

A general view of the problem of this book's title is offered by Professor Rupert Hall and Paolo Rossi. Theirs are polemical pieces directed against the advocates of the 'influence' of the alchemical-mystical tradition on the new science. Certainly, they could not find a more knowledgeable and sympathetic antagonist than Rossi, since his studies on Bacon were among the first to exhibit the interplay of continuity and change in the origins of the new natural philosophy from its roots in traditional philosophies, rhetoric, the mechanical arts, and magic. Yet he has chosen to refute rather than assimilate the new claims.

The absence of an ecumenical survey of the problem reflects the fact that at root the debate is ideological. With all that we may now have to admit of the imperfections of the enlightenment and the positivist views of science and its origins, to some it is still a question of rationality in eternal struggle with the irrational. I personally think that Professor Hall is too restrictive, as when he condemns Namierite history as 'irrational' because it ascribes private personal motives for political action. But he and Rossi are together in what seems to be their implicit understanding of the 'irrational', as any view that supposes the faculty of 'rationality' to exist outside the minds of man. By such a criterion much of the hard scientific work on which the scientific revolution was based was accomplished by men who fall wholly or partly under the ban, as Gilbert, Kepler and Harvey. Clearly, the matter needs further analysis.

As a record of a symposium, this is a testimony to the skills of the organisers in bringing together an unusually distinguished and lively gathering. As an exploration of a new facet of a perennial problem, 'the origins of modern science' it represents a good start.

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†*Reason, Experiment and Mysticism in the Scientific Revolution*. By M. L. Righini Bonelli and William R. Shea. Pp. 320. (Macmillan: London and Basingstoke; Science History: New York, 1975.) £13.00; \$20.00.

Border Island, Arctic Canada



*The Work of the River: A Critical study of the central aspects of Geomorphogeny*. By C. H. Crickmay. Pp. xvi+271. (Macmillan: London and Basingstoke, January 1975.) £12.00 net.

FOR over fifty years the author of this book has been concerned with the study of physical geology in the field and the interpretation of scenery in terms of fluvial processes. Here he summarises his findings and theories in a format suitable for students and indeed for anyone interested in river-shaped landscapes.

First, the reader is introduced in an elementary way to the forms of moving water on land surfaces, to the nature of the seasonal work of rivers and to the physical attributes of riverine environments. There follow more advanced discussions on fluvial dynamics and channel equilibrium relationships, with much on grade and interesting comments on other aspects such as cavitation. The erosive work of rivers is then outlined with special attention to base level and a chapter is devoted to examining the hypotheses that constitute the beliefs of several schools of geomorphology.

How then does the author interpret real scenery or landforms seen in the field today? To him the key lies in the great difference between the rate of erosion in river valleys and on flat areas. His main postulations are the hypothesis of unequal activity and the concepts of activeness and stagnancy in landform development. "Some areas of the Earth's surface are almost immune from the postulated [by others] universal destruction by wasting". Ground that is nearly flat or gently sloping (that is, with slopes of under about 5°) makes up the main part of the land surface of the Earth. This abundance of flat land in patches of all sizes up to vast expanses "demonstrates that most denudation is horizontally pursued" by the lateral swinging of rivers mainly at grade.

Natural scenery consists of an endlessly varied combination of flats and slopes but since absolute horizontality is rare the Earth's surface may be classified into very gentle gradients or flats and steeper gradients or slopes. Their most significant general relationship is the repetition of one above the other vertically. The flats are stagnant, the slopes active. If stagnant, a geomorphic form may persist almost indefinitely. Although rivers are active erosion agents and wasting may break down all steep slopes, there are certain tracts that survive this destruction because they are out of its reach. When the peripheral flatness extends into the central remnants and predominates there, the land has become a true *Endrumpf*. The ultimate product can only be one broad, low level flat.

These general assumptions mean that most existing scenery was made in time long past and is today essentially relic material. Mountains are areas of "activeness", and the author takes the view that "periods of deep diastrophic calm" are longer than epochs, such as the present, which are characterised by diastrophic agitation and frequent uplifts. The inclusion in the arguments of what to many readers will seem the obvious and the controversial is characteristic of the whole theme. But much of the accepted creed is clearly stated and will be of considerable practical value to earth scientists. Controversy seems inevitable in these natural sciences. For example, is continental drift or mountain building ever still? What is the base level of erosion when low tide mark is far below sea level? Would not high tide and waves consume any flat land mass at base level? But this is the sort of controversy the author deliberately sets out to provoke. Students and earth scientists will find his book a stimulating addition to their bibliographies and as beneficial as a dose of vitamin C after a long season of hibernation.

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