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SAL RESTIVO, *The social relations of physics, mysticism, and mathematics. Studies in social structure, interests, and ideas.* (Episteme, volume 10.) Dordrecht, Boston and Lancaster: D. Reidel Publishing Company, 1983. ix + 309 pp. Dfl 114/\$49.50.

Restivo's book consists of two almost fully separate studies, one on physics and mysticism and one on mathematics, united only through the common attempt to apply what the author considers a materialist sociological approach and through his wish to use both studies in the elaboration of an 'emancipatory epistemic strategy' (p. 1).

Part I starts from the claim advanced by F. Capra (among others) that there is a parallel between modern quantum and particle physics and Eastern mysticism. Restivo argues that much of the evidence for the thesis stems from highly problematic translations of Eastern texts and

mathematical symbolism into English and from metaphors employed by physicist with knowledge of mysticism or by modern mystics knowing some physics; and that the rest includes the conflation between undifferentiated ('holistic') and integrated ('wholistic') ways of seeing the world. In an attempt to get behind the parallelist claim, sociological explanations of mysticism and of aspects of physical theory-building are proposed, and the functions of parallelist claims (to physicists and mystics and in general) are investigated.

In this connection, a 'Needham-Yates-(Mary)Douglas-thesis' is sketched, namely, that the way from a rigid (pseudo-)rationality to more adequate rationality may go once more via an antirationalist and even occultist breakdown, as in the early Renaissance. On the premiss that our present world stands in a watershed and needs a new kind of rationality and understanding, the parallelist strategy is discussed and rejected as 'a (vulgar) reaction to "the failure of modern science in its claim to universal rationality"' (p. 119) and as 'dependent on a naive account of two narrowly and uncritically conceived modes of knowing' (p. 137). Finally, a conclusion 'brings together a number of ideas formulated by myself and others over the last several years, but stops short of a systematic synthesis' (p. 1)—an adequate description of other chapters too. The synthesis which waits around the corner appears to be a permanent epistemic revolution inspired by David Bohm (and, through him, by a fundamental misunderstanding of Piaget, p. 131) and by Feyerabend. The author seems not to bother about e.g. Piaget's and Kuhn's structural arguments that epistemic revolutions *cannot* be permanent. Nor does he, when building on Forman's analysis of 'Weimar Physics',¹ bother about the criticism aroused by that paper.²

Part II is stated to be an 'introduction to materialist sociology of mathematics' (p. 1). It starts by presenting a number of non-Marxist "sociologies" of mathematics (including Wittgenstein, Lakatos, Wilder, Fisher and Hagstrom). Next, Marx, Bukharin's and Colman's contributions to the London Congress for the History of Science in 1931, and Struik's work on the social aspect of mathematical development, are presented through select points of view, together with some recent approaches. The Marxist current (as presented) is evaluated as a step in the right direction, but unsufficiently materialist; instead, Spengler is introduced as the fulfilment of the promises of historical materialism, because of his insistence that mathematics are plural, depending on incommensurable world views.

The root for this point of view, which may astonish materialists as much as Spenglerians, lies in Restivo's way of getting rid of Platonism: If mathematics does not exist 'out there' in ready-made, transcendental form, it must be a purely human, and so a purely social product. (Parabolically expressed: If 'reality' is not flat and shaded in grey, the photograph must be explained as a product of the camera *alone*.) At times, he tries to get beyond this undialectical dilemma, stating e.g. that a 'reality' exists which survives single individuals and civilisations; but since this reality is only common to those who 'participate in the same or overlapping communities of consensus' (p. 231), he cannot escape from his radical 'sociological solipsism'.

It appears strange that an author who tries to investigate the carrying capacity of Marxist points of view seems unaware of dialectical materialist attempts to solve his dilemma—be it Engels, Lenin's *Philosophical Note-Books*, recent Soviet philosophy,³ or even a recent American article discussed in the book.⁴ Instead, the impossibility of sticking to pure solipsism leads occasionally to very crude instances of 'spontaneous dialectical materialism', as when it is stated in a discussion of the *genesis* of non-Euclidean geometry that 'Riemannian geometry reflects the reality that the real properties of space may differ more or less from what Euclidean geometry states' (p. 234).

¹ Paul Forman, 'Weimar culture, causality, and quantum theory, 1918–1927: Adaptation by German physicists and mathematicians to a hostile intellectual environment', *Historical Studies in the Physical Sciences*, 3 (1971), 1–115.

² Cf. the review article by John Hendry, 'Weimar culture and quantum causality', *History of Science*, 18 (1980), 155–80.

³ Accessible e.g. in the U.S.A. through A. D. Aleksandrov, 'Mathematics: Its essential nature and objective laws of development', *Science and Nature*, 3 (1980), 22–40. This is the epistemological section suppressed in the American translation of *Mathematics. Its contents, methods, and meaning*, edited by A. D. Aleksandrov *et al.* (American Mathematical Society, 1963; 2nd ed. Cambridge, Mass., 1977), a book which is used by Restivo; cf. 'Editorial comment on the AMS and political censorship *within* science', *Science and Nature*, 3 (1980), 40–2.

⁴ Chandler Davis, 'Materialist mathematics', in *For Dirk Struik*, edited by R. S. Cohen, J. J. Stachel and M. W. Wartofsky (Dordrecht & Boston, 1974), pp. 37–66.

Part II concludes with two chapters on 'Mathematics in Ancient Greece', and 'Mathematics in Europe, 1200–1700'. They are built exclusively on a restricted selection of secondary and tertiary literature and are, in the reviewer's opinion, much too superficial to carry any conclusions. To mention only some of the problematic points: Ionian natural speculation was primarily developed 'in the interest of commercial exploitation' (p. 246, cf. p. 241)—presumably a misreading of Farrington; Proclus's list of mathematicians prior to Euclid (drawn presumably from the quotation in Van der Waerden's *Science Awakening*⁵) is read as a description of a teacher–student network stretching back to 600 B.C. (p. 247); Archimedes was 'the last breath of Greek mathematics' (p. 250), original minds like Apollonius, Hipparchus and Ptolemy being non-existent; in spite of the sociological interest in scholarly communities, the Medieval universities go unnoticed (like all universities prior to a scornful remark by Leibniz); Stevin and others 'begin their mathematical labors in the sixteenth and seventeenth centuries essentially where Archimedes' work ends' (p. 239), as if neither algebra nor trigonometry plays a rôle; and astronomy appears to have been irrelevant for the cultivation and development of mathematics until around 1650.

The manufacture of the book is of the usual good Reidel quality (and the price at usual Reidel levels!). Other technical features are less satisfactory. The notes make unrestricted use of the *op. cit.* technique, forcing the reader from, e.g., chapter 15, note 6, back to chapter 9, note 3 (132 notes back) if he wants to find out that 'Marx, 1967, *op. cit.*' represents *Grundrisse* (the name index does not cover the notes). The listings in the subject index are random. So, 'holism' is referred to p. 16, where only 'wholism' appears; the two places where 'holism' is distinguished from 'wholism' (cf. above), *viz.* pp. 100 and 116, are absent; the keyword 'wholism', on the other hand, is not referred to p. 16. The name index, on the other hand, is fairly satisfactory.

In part, the incoherence and eclecticism of the book are due to the inclusion of more or less revised versions of previous publications (mostly reviews) as chapters or sections of chapters. This raises the question whether the publication of a set of selected studies would not have been preferable.

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⁵ B. L. van der Waerden, *Science awakening*, 2nd ed. (Leiden, 1961 and later), p. 90f.