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ROM HARRÉ, *Great scientific experiments*, Oxford, Phaidon Press, 1981, 8vo, pp. 224, illus., £8.95.

In little more than 200 pages Dr. Harré manages to describe the reasoning behind twenty experiments, the apparatus involved, and the results. They cover a wide range of sciences distributed between Aristotle's biology and quantum mechanics. The amount of information included is remarkable. For example, he has been able, in a few pages, to outline the essentials of wave theory and the four quantum numbers used to express the behaviour of electrons. All this as a preliminary to the description of the method used by Otto Stern to demonstrate diffraction among atoms in a beam of helium.

The experiments were selected by certain rather rigid criteria. Many of them are experiments that have been misinterpreted. Most were influential at the time they were done, rather than achieving fame later by hindsight. Third, the experiments chosen were elegant and often simple. Fourth, some series of experiments are described, such as Michael Faraday's demonstration of the similarity of all the various kinds of electricity. Harré is anxious to show that no experiment stands alone.

What is an experiment? The author discusses the question interestingly in the introduction to his book but comes to no very precise answer. He explains that experiments should have certain fixed parameters and then proceed to use independent variables to produce dependent ones. He notes it is not possible where human actions are concerned to separate variables and parameters. It is not surprising, therefore, that the only medical experiment among the twenty he describes is Pasteur's preparation of artificial vaccines. One should surely not conclude that medicine does not use experiment.

The book certainly contains materials for interesting discussion of the nature of experiment. It will be useful not only for school work but for anyone who wishes for a new insight into the history of science and the value of scientific method.

J. Z. Young
Wellcome Institute

TREVOR H. LEVERE, *Poetry realized in nature*, Cambridge University Press, 1981, pp. ix, 271, £22.50.

The extent of the Romantics' involvement with science – for long either dismissed as an embarrassment, or merely taken as read – is now being investigated in detail; certain surprises, and revisions of judgment, are the result. Dietrich von Engelhardt's analysis of Hegel's *Naturphilosophie* has shown that it is not the uninformed dialectical farrago it might appear; the recent work of P. R. Sloan and T. Lenoir has exhibited the subtlety and sophistication of, for example, Blumenbach's conception of *Bildungstrieb*. But while Goethe has not lacked sympathetic commentators for his scientific interests, there has been a surprising lacuna in the otherwise overburgeoned field of studies of his closest English analogue, Samuel Taylor Coleridge. This neglect is apparent even among the most influential Coleridge scholars. To mention two examples: in *Coleridge and the Pantheist tradition*, Thomas McFarland adopted a largely dismissive attitude towards Coleridge's scientific pretensions, which marred his searching analyses of Coleridge's indebtedness to Boehme, Spinoza, and Schelling; again, the scientific annotations represent in many ways the weakest feature of Kathleen Coburn's valuable edition of the *Notebooks*.

So Trevor Levere's lucid and engaging study of 'Samuel Taylor Coleridge and early nineteenth-century science' is both timely and requisite. It is written with admirable clarity; a virtue the more necessary in view of the densely-compacted prose style of the *Opus maximum* and related works, whose diction is far from the quiet and tender precision of *Frost at midnight*. If Levere's exegeses occasionally have the defect of making Coleridge's thought seem tautologous (which it may have been) or tediously banal (which it wasn't), he has untwisted with care the separate strands of what Coleridge himself admitted was "too often an *entortillage* in

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the sentences and even the thoughts that nothing can justify . . ." (letter to Thomas Poole, 9.10.1809).

The book falls into two halves; the first largely chronological, commencing with Coleridge's period at Bristol and Nether Stowey. As might have been expected from his previous work (*Affinity and matter*, 1971), Levere is particularly illuminating as to Coleridge's early friendship with Thomas Beddoes and Humphry Davy; the shifting terms of the latter relationship being well charted, as Coleridge moved from Socinian radicalism to Anglican apologetics, whilst, as Coleridge lamented, Davy became "Sir Humphry Davy & an *Atomist!*". Davy's pioneering experiments in electrolysis were to provide a formidable exemplification of the Law of Polarity as it came to be developed; evidence that (contrary to Davy, although this remains a vexed question) Coleridge was to assimilate to the contemporary work of J. W. Ritter, conducted within an explicit framework of Schellingian *Naturphilosophie*. For the pre-Malta period, Levere underplays Coleridge's friendship with Thomas Poole, Tom Wedgwood, and the London radicals: this is unfortunate, as an assessment of the formative influence of Friend, Godwin, and Thelwall – evident in the Hartleyan tenor of the *Lectures on revealed religion* of 1795 – would have pointed up the contrast with the anti-empiricist methodology of the third section of *The Friend* (later reworked as the introductory Treatise on Method for the *Encyclopaedia Metropolitana*), and might have shed light on Coleridge's hostility to Natural Theology *qua* theology. These themes are discussed in Chapter 4, which convincingly brings out the rationale underlying Coleridge's simultaneous contempt for Paley (one possible legacy to J. H. Newman), and his delight in the precise observation of John Ray or Gilbert White, which has its counterpart in, say, Coleridge's own minute attention to the colours of films of flame. But watching the fire also conduces to philosophical reverie, the paregoric close at hand. The Trinitarian mania of Coleridge's maturity had as its metaphysical basis a vision of the world governed in its every detail by a logic of polarity, the dynamic pentad of Prothesis; Thesis, Indifference, and Antithesis; and Synthesis. As Snyder, Newsome, Jackson, and others have shown, while Coleridge's polar logic may be seen as a later flowering of a peculiarly English strain of neoplatonism originating with Ralph Cudworth and Henry More, its immediate source lies in the post-Kantian *Naturphilosophie* of Schelling, Ritter, Steffens, Oken, and von Schubert.

Levere's study comes into its own in its second, analytic, half, where Coleridge's familiarity with the canonical texts of German scientific romanticism is demonstrated, and their influence upon his theories of cosmology, geology, chemistry, and organic life explored. While McFarland went to extreme lengths to redeem Coleridge from charges of plagiarism, Levere implicitly takes a more balanced view as to Coleridge's heavy debts to the *Naturphilosophen*, displaying clearly how far Coleridge diverged, often with impatience, from their positions. So Coleridge's logical pentad represents a highly idiosyncratic Anglo-German wedding, wherein allegorical interpretations of Genesis are reconciled with the polar schemata of Schelling and Steffens: reality lies at the intersection of the polarities of being and becoming, as galvanism of those of magnetism and electricity, and integral bodies those of gravitation and light. In this way too, as Haeger has exhibited, Blumenbach's account of racial degeneration is seen as a case of polar differentiation, and provided with a biblical gloss; Noah is taken as the Caucasian Prothesis from whom the Shemitic, Hamitic, and Japhetic races devolve. Such concerns culminated in Coleridge's theory of life. Levere's account of Coleridge's vitalism is annoyingly split between Chapters 2 and 7; the former investigates Coleridge's relations with the London doctors, James Gillman and Joseph Henry Green, and provides a useful overview of the William Lawrence affair from the perspective of Highgate; Coleridge's qualified championing of Abernethy underlies his *Essay on scrofula* and *Theory of life*.

The final chapter limns out the philosophical basis of Coleridge's vision of organic creation, a living pyramid of prophetic types, at whose apex is Man: "He has the whole world in counterpoint to him, but he contains the entire world within himself." The position is a familiar one, even if the reasoning by which it is attained is circuitous and strange. *Poetry realized in nature* goes a long way towards clarifying the reasoning: yet it retains its strangeness, and its charm. On the flyleaf of his copy of Oken's *Lehrbuch der Naturgeschichte*, Coleridge

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exclaimed: "What a strange allegorical Hyberno-flumiflammant Head Oken must have!", elsewhere awarding him marks:

Oken	= 7 1/2
Genius	= 2 1/2
Talent	= 4 1/2
Sense	= 0 1/2
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	7 1/2

However tempted we may be to exclaim over Coleridge's head, it is still unwise to sum up his mind.

Lawrence Pedersen
Wellcome Institute

W. F. BYNUM, E. J. BROWNE and R. PORTER (editors), *Dictionary of the history of science*, London, Macmillan, 1981, 8vo, pp. xxxiv, 494, £17.50.

Dictionaries come in two sizes. Giant-sized dictionaries, such as *The dictionary of scientific biography* or the *Encyclopedia of philosophy*, contain detailed articles, the best of which overflow with erudition, sparkle with originality, and provide enough bibliographical information to satisfy the *cognoscente*. On the other hand, economy-sized dictionaries, like T. I. Williams (editor), *A biographical dictionary of scientists*, give only sufficient detail to answer the most basic questions, to whet the appetite, and to indicate further readings. This recently-published *Dictionary of the history of science* falls in the latter category. Some seven hundred articles concerning leading ideas in the history of science – ranging from "abduction" and the "aberration of light" to "Zilsel[']s] thesis" and "zoology" – are contained within a span of four hundred and fifty pages. The topics are concerned principally with the history of science (with comparatively few on clinical medicine or technology) but there are also many entries relating to the philosophy, sociology, and historiography of science. The value of the *Dictionary* is greatly increased by copious cross-references. Moreover, users confronting specific problems will also appreciate the general bibliography provided at the front of the work and the index of scientists' names at the end.

In general, the articles, which have been written by a panel of specialists, are succinct, although necessarily brief, and most are readily accessible to the non-specialist. Under a typical entry one can find discussion of the scientists who principally contributed to that subject, an outline of its development, its connexion with other topics, and, finally, bibliographical references to enable the reader to explore the subject further. On the last of these issues the user may be somewhat disappointed, since all too many entries contain inadequate bibliographies. Major topics, such as "natural theology", "structuralism", and "geology" do not merit any bibliographical reference, while "psychoanalysis" receives but a single entry. By contrast, the article "sociology of (scientific) knowledge" is graced by no fewer than thirty-four references, most of which are not core readings in that subject.

One way of assessing a dictionary of this type is to test it in the field, as it were. When the book reached this reviewer he was engaged in preparing a lecture on nineteenth-century electromagnetism. He was surprised that there was no entry under either "Maxwell's equations" or "electromagnetism", although "electromagnetic induction" produced a cross-reference to a five-column article on "electricity and magnetism" which summarized in two paragraphs Maxwell's contributions to the subject and produced two germane references. Subsequent trials on other topics have shown the very variable standards achieved in this volume. Some relatively obscure topics, such as "gravity outside the solar system", merit inclusion and there is a notable partiality in many of the articles on historiographical issues.

Historians of science will turn to this volume principally for introductions to unfamiliar territory – as such they will find it a useful addition to their bookshelves. Moreover, as a contribution to the reference works on our subject this *Dictionary* should be of assistance to