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JOHN KADVANY. **Imre Lakatos and the Guises of Reason**. Durham, N. C., and London: Duke University Press, 2001. ISBN 0-8223-2649-3 (paper covers), 0-8223-2659-0 (cloth). Pp. xx + 379.

Reviewed by MATTEO MOTTERLINI*

This book is not intended as the intellectual biography of a 'charming and wicked' Central European émigré such as IL (Imre Lakatos was born Imre Lipsitz in Debrecen, Hungary in 1922); rather it aims at disclosing the 'hidden or secret' story that is embedded both in Lakatos's syncretic philosophical project and in Hungarian Stalinism between World War II and the Hungarian Revolution of 1956, *i.e.*, a story of the cunning survival of reason in several of its guises. In fact, Lakatos's work is a peculiar mix that takes different forms depending on whether the Hegelian-Marxist component is corrected by Popper's ideas, or Popperian falsificationism is ameliorated by means of Hegelian historicism. A well regarded product of such a 'Pop-Hegelian' philosophical conflation is Lakatos's *Proofs and Refutations*, completed in the early sixties in Cambridge where Lakatos took refuge after the Hungarian uprising in late 1956. Lakatos acknowledges 'three major—and apparently quite incompatible—"ideological sources" of his work: Pólya's mathematical heuristics, Hegel's dialectic, and Popper's fallibilism'. The emphasis on the dynamic unfolding of mathematical knowledge is a clear reference to Hegel; whereas when Lakatos refers to Popper he is stressing the value of refutation for the growth of knowledge and taking a position against any account of mathematics as certain and definitive knowledge. (I shall deal with Pólya's influence later).

Lakatosian scholars have recently highlighted the inspiring and powerful Hegelian component of Lakatos's philosophy of the natural sciences (Hacking [1979], Motterlini [2002]) as well as of his philosophy of mathematics (Forrai [1993], Larvor [1998], Kvasz [2002]), and political practice (Congdon [2002], Ropolyi [2002]). However, no one but Kadvany has so effectively enlightened the cross-cultural heritage of Lakatos's English-language work in connection with nineteenth-century political history and history of ideas. Moreover, what makes the task of *The Guises of Reason* particularly challenging and appealing is the twofold aim of its enquiry: on the one hand, Kadvany makes extensive use of continental thinkers such as Goethe, Hegel,

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Marx, Lukács and Thomas Mann to disclose the source of the innovative ideas that Lakatos brought into Anglo-American philosophy of science. On the other hand, Kadvany uses Lakatos's philosophy as a window onto the world of Stalinist Hungary. Through this window the reader can place the ambiguities and unresolved questions of Lakatos's rationalism in the context of the ambiguities and challenges that Hungarian society had to face along the road to 1956 and after. As Kadvany sharply puts it:

> In caricature, Lakatos' Stalinist Hungary was itself predicated on patterns of sceptical undecidability created through dissemblance, surveillance, informing, and betrayal. In broad epistemic terms, the depravity of Stalinism was an evil, inverted twin of sceptical, even scientific, criticism. In this way, the fascinating contradictions of Lakatos's many-layered ideas and life are those of the dangerous world he fled. (p. xix)[1]

Kadvany's analysis is rich, broad, and articulated. It ranges from the history of philosophical ideas to political economy, from nineteenth-century literature to detailed Hungarian history, from case studies in the history of sciences and mathematics to lengthy accounts of Lakatos's life and personality. I shall confine this review to two major original themes: (i) the pedagogy of mathematics and (ii) the role played by history in investigating mathematical and scientific method. Both themes will be placed against the background of the Hegelian-Marxist-Lukácsian legacy and the related problem of justifying rationality as a normative notion by taking history at its face value. I shall then (iii) point at an unresolved question of Lakatos's (and Hegel's) rationalistic project; and (iv) conclude with a minor criticism.

(i) According to Kadvany, Lakatos was primarily and fundamentally an educator of a peculiar sort. An educator of 'reason and several of its guises' (p. 19). And his masterpiece *Proofs and Refutations* is also a peculiar pedagogical treatise. The peculiarity consists in the narrative technique he employed, which is the one of the *Bildungsroman* genre created by Johan Wolfgang von Goethe in his *Wilhelm Meister* novels and used by Hegel in the *Phenomenology of Spirit*. The *Bildungsroman* provides a model for the development of individual character while simultaneously painting a portrait of the culture from which the hero gains values, skills, and interests. In *Proofs and Refutations* the individual character, the hero, is Euler's conjecture and its historical odyssey, whereas the culture portrayed is the features of nineteenth-century and contemporary methods of mathematical proofs. The moral is rationality as a dialectical process of self-formative learning through error.

With reference to Hegel, it is worth noticing that the source of inspiration is merely 'ideological'. As far as we know, Lakatos might never have read Hegel's works and, like many others, might have known of Hegel by

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[1] Otherwise unattributed page numbers refer to the book under review.

what he had read in Marx and Lukács. However, the important specification here is that Lakatos's mathematical Hegelianism does not endorse Hegel's undialectical philosophy of mathematics. On the contrary, Lakatos criticises precisely that kind of 'deductive style' and static rationality that is typical of Hegel's idea of mathematics as proposed in the *Phenomenology of Spirit*. In this work, Hegel regards mathematics as the 'inert and lifeless' realm of 'rigid, dead propositions', *i.e.*, the very opposite of the dynamic *self-movement of concepts which constitutes* the subject matter of Hegel's philosophy and Lakatos's *Proofs and Refutations* (Larvor, [1999], p. 23). So what Lakatos took from Hegel is rather the historiographical technique and the phenomenological criticism of the *Phenomenology of Spirit* to challenge formalism in mathematics and to explore the improvement of informal proofs in history and their interaction with the standard of evaluation of mathematical proofs—which are shown to be themselves crucially historical.

According to Lakatos, the main limitation of the Euclidean deductivist style of mathematical reasoning is that it conceals the logic of mathematical development and conceives mathematics as certain, infallible, and authoritarian. Moreover it downgrades the importance of criticism in mathematics and supports an antipedagogical, antispeculative and puritanical attitude. Now, suppose we express the proof of a theorem in a given axiomatic-formal system; if we accept that the latter is consistent, we could thereby exclude the possibility of formalising any counter-example in terms of the given system. But mathematics in the making, mathematics in its growing process—Lakatos argues—rarely expresses itself in axiomatic-formal theories; instead, mathematicians as well as scientists make progress through conjectures, experiments, and refutations. In fact, Lakatos considers informal proof as just another name for thought experiment. Broadly speaking, just as in physics we have to deal with an entire experimental set-up in order to guess why a theoretical system has failed, and to find the possible ways out, so in mathematics we have to analyse 'proof-thought experiments' in order to find the hidden assumption from which a paradoxical result or contradiction follows. Feedback from counter-examples is particularly crucial in mathematics because, in calling for a further analysis of the primitive conjecture (theorem) and of the proof, it suggests where the amendments have to be made and which (no longer hidden) lemma has to be replaced.

Lakatos's original heuristic logic of mathematical discovery therefore deals with the dynamic formation of mathematical objects and proofs in a given historical and linguistic setting. Notably, Ian Hacking [1979] suggested reading *Proofs and Refutations* together with Wittgenstein's *Remarks on the Foundations of Mathematics*—a book Lakatos had studied intensively. According to Hacking, 'where Wittgenstein gives hypothetical illustrations about following rules, diverging practices and concept forma-

tion, Lakatos gives real life examples. Wittgenstein's book is, in this re-
spect, like a bestiary compared to Lakatos' natural history' (p. 400). The
lesson Lakatos derives from history is that one should not treat any given
language with too much deference since it can easily turn into a conceptual
prison:

> Usually, when a 'counterexample' is presented, you have a choice: either you
> refuse to bother with it, since it is not a counterexample at all in your given lan-
> guage L1, or you agree to change your language by concept-stretching and ac-
> cept the counterexample in your new language L2 ... According to traditional
> static rationality you would have to make the first choice. Science teaches
> you to make the second. ... As knowledge grows, languages change. ... The
> growth of knowledge cannot be modelled in any given language. (Lakatos
> [1976], p. 93)

Concepts are not taken in isolation; rather they are embedded in a broad
body of knowledge. For example, when the concept of polyhedron changes,
so do the concepts of edge, face, and vertex. This is why in doing mathe-
matics it may happen that 'one does not solve the problem one has set out
to solve' or that 'one does not prove what one has set out to prove'. As
a matter of fact with the generation of a new proof 'your term no longer
denotes what it set out to denote' (*ibid.* p. 90).

According to Lakatos, the main limitation brought by the unification of
formal logic and nineteenth-century mathematics is the construction of a
formal language to capture artificial and frozen mathematical objects. To
this static notion of rationality, Lakatos opposes a dynamic one focused on
the critical process by which mathematical arguments improve mathemat-
ical concepts. Furthermore, the challenge of *Proofs and Refutations* is to
articulate the conceptual change in rational terms. This is what the heuris-
tic as art of mathematical discovery really aims at. And, in as much as it
consists of the study of conceptual growth by argument, it is, in this specific
sense, dialectics (*cf.* Larvor [1998], p. 14). However, the dynamic dimension
is not just a feature of mathematical concepts but also of mathematical crit-
icism. This is why historical and epistemological analysis is so intertwined.
The development of Euler's theorem, from its primitive formulation to the
topological version of Poincaré on the background of nineteenth-century his-
tory of mathematics as in *Proofs and Refutations*, aims precisely at showing
not only that mathematical language does change, but that mathematical
methods, standards of evaluation, and the nature of mathematical criticism
are historical and subject to change too.

Such a meta-methodological level of Lakatos's analysis, combined with
Lakatos's pedagogical goals, forcefully support Kadvany's original claim
that *Proofs and Refutations* is modelled on Hegel's *Phenomenology of
Spirit* and accounts for a 'mathematical *Bildungsroman*'. Not surprisingly,
Lakatos himself refers to his ingenious historiography as the 'phylogenesis

and ontogenesis of mathematical thought', thus taking possession of the bio-
genetics metaphor that Marx himself borrowed from Hegel. Just as Hegel
represents the historical development of a generic philosophical conscious-
ness against the history of forms of social consciousness embodied in the
forms of life and cultural practices chosen from Western European history,
Lakatos presents contemporary standards of rigor against the background
of nineteenth-century mathematics. Just as Hegel promises a philosophi-
cal pedagogy, Lakatos provides pedagogy of proof-techniques or methods of
mathematical heuristic (pp. 31–35). By the historicization of mathematical
methodology, Lakatos depicts a genealogy of mathematical canons of eval-
uation according to which the very concept of (mathematical) criticism is
also historically variable. ('The concept of criticism, counterexample, con-
sequence, truth, and proof are inseparable; when they change, the primary
change occurs in the concept of criticism', Lakatos [1976], p. 104.) Lakatos,
like Hegel, it is not interested in the naked result, stripped by its history of
trials and errors, but rather, in Hegel's words, in the result together with
its becoming.

(ii) Let us now turn to the explicit role of historiography in Lakatos's
philosophical history. Lakatos's parody of Kant's maxim is well known:
'philosophy of science without history of science is empty; history of sci-
ence without philosophy of science is blind'. Related to this is Lakatos's
meta-methodology: as we appraise scientific theories, we should be able
to appraise the standards of appraisal. The tool for this task is of course
history, and the meta-criterion is provided by the methodology of historical
research programmes. According to Lakatos, each methodology functions
as the 'hard core' of a historiographical research programme. In partic-
ular, we accept a methodological proposal if it can be shown that it was
effective in paradigmatic cases of the growth of knowledge—that is, on the
basis of the rational reconstruction to which it leads. In fact, even though
there has been no general agreement concerning a methodological criterion,
Lakatos maintains there has been considerable agreement about whether
a particular step in the game was scientific or crankish, or whether a par-
ticular gambit was played correctly or not. Thus Lakatos's meta-criterion
appraises methodologies on their ability to provide historical reconstruc-
tions minimising the influence of 'external' factors and maximising 'internal'
explanations. The Hegelian influence is once again crucial in this context.
Following Hegel, Lakatos starts from the premise that knowledge does grow,
suggesting that the task for the philosopher is to extract rationality from
the historical development. Following Popper, but going beyond his anti-
historicistic rationalism, he takes a fallibilist stance on the issue of what
constitutes the rationality of science (or, which is the same, on the prin-
ciples that govern its growth). Recall that, for Popper, the very question:
'Under what conditions would you give up your demarcation criterion?'

was outside the boundaries of his own epistemological project (*cf*. Popper [1959], pp. 53–56). But this is exactly what Lakatos asks Popper. Fallibilism at the meta-level of the appraisal of methodologies implies that one has to test theories of rationality against the history of science. Such a test, as Kadvany points out,

> is a novel and modernized Marxian yardstick for sequences of ideas of social institutions. Just as Marx argued that philosophy needed to transform itself into social criticism by comparing the Hegelian political model-ideal with political reality, then so too for the comparison of Popper, or any methodology of science, and history. (p. 215)

The second part of the Kant parody clearly aims at the ineluctable dependence of history on some interpretative theory. Histories are always theory- (or, better, research-programme- or methodology-) laden. In this respect too, Hegel and Lakatos share an almost identical conception:

> Lakatos carefully distinguishes events and their representations by remarking, 'Unfortunately there is only one single word in most languages to denote history1 (the set of events), and history2 (a set of theoretical propositions). And history2 is a theory- and value-laden reconstruction of history1'. So too for Hegel: 'In our language, the word 'history' [that is *Geschichte*, from *geschehen*, to happen] combines both objective and subjective meanings, for it denotes the *historia rerum gestarum* as well as the *res gestae* themselves, the historical narrative and the actual happenings, deeds and events—which, in the stricter sense, are quite distinct from one another'. It is good that Lakatos never claimed any originality for his ideas. (p. 219)

Not surprisingly, Lakatos was charged by Feyerabend with misusing rather than using history. According to him, the more 'rational' the reconstruction the greater is the mystification. Similarly, according to Kuhn, Lakatos's theory-laden history is not history at all but 'philosophy fabricating examples'. However, Lakatos had no problem in finding himself guilty. In fact, he consciously made historical caricatures and their fabrication process (induced by normative methodologies) a 'deliberate topic of study' (p. 218).

(iii) The real question for Lakatos was rather to provide (meta-)criteria according to which one caricature or fabrication is better than another. In a dynamic setting this amounts to taking the problem of justifiable changes—at the level of scientific theories as well as of scientific standards of evaluation—to be central. Moreover, since we are not prepared to accept such standards *a priori*, we need to test these principles against historical cases and general practice. Thus, to justify a set of principles that characterise scientific practice in a given domain, one generates principles that conform to commonly accepted cases and practices. If such principles establish judgements that do not conform to general cases and practices, then the principles are modified; if, however, such modifications produce principles that are intuitively unacceptable, then the cases and practices can be,

in turn, rejected or modified.

This is the core problem of Lakatos's never written 'Changing logic of (mathematical and scientific) discovery'. And, as Kadvany shows, this idea is also rooted in Hegel, and, more precisely, in Hegel's criticism of Kant:

> while Hegel supported Kant's project to subject metaphysical categories to criticism, Hegel also expected that criteria for the practice of philosophical criticism not escape the critical net. ... On the other hand, the issue for Hegel was how to evade the sceptical problem of the criterion in general, meaning how to avoid or naturalize an infinite regress of justification' (p. 229).

Hegel's idea was thus to combine at once meta-theory and critical theory in the same project. ('What we want is to combine in our process of enquiry the actions of the forms of thought with a criticism of them' Hegel, *Science of Logic*, quoted by Kadvany, p. 230.) This goal of a 'complete immanent logic' as well as a lesson in dialectical reasoning is what Lakatos's 'Changing logic' would also have aimed at. But, a part of Hegel's dialectical pyrotechnics, the problem of criticism and the sceptical problem of the criterion, are not solved either in Hegel or in Lakatos. Perhaps, the equilibrium between principles and cases generated by means of such a dialectical procedure is both unavoidable and inherently unstable. And so is the case for any normative theory of scientific rationality based upon it—including Lakatos's. In this respect, Lakatos's sophisticated attempt of grasping the unfolding of reason and presenting it 'cut and dried' after its process of formation has been completed may well turn out to be an illusion. Perhaps Lakatos's project of the justification of objective canons of evaluation of scientific claims that are genuinely epistemological and not reducible to psychological, biological, or sociological factors is doomed to remain incomplete.

This is also why, in my opinion, Kadvany leaves the main question of Lakatos's rationalistic enterprise unanswered, were it not for a sort of anthropological consideration. After all, Lakatos's philosophy may well be considered a rationalism 'at least because it could help to keep one sane in an insane world' (p. 315). The world Kadvany refers to is a world in which any workable conception of truth and falsity is lost and in which 'dissemblance, surveillance, paranoia, fear and falsification of political life and history permeated social interactions and cultural life' (p. xvi)—that is, the Hungarian world from the end of World War II to the 1956 Revolution, of which Lakatos's philosophy is nothing but a manifestation.

(iv) Two final remarks. As I said, Kadvany's book superbly composes the puzzle of Lakatos's philosophy by bringing together many interesting details. Two relevant pieces, however, are left out of the puzzle. Rather astonishingly, there is not a single reference to György Pólya in the entire book. Pólya's influence on Lakatos is both important and well documented by Lakatosian scholars (see for example Forrai [1993], Zheng [1990], Larvor

[1998], and Kiss [2002]) and by Lakatos himself. Let me just remind you here that it was thanks to his fellow Hungarian émigré that Lakatos became interested in mathematics as a problem-solving activity and as an experimental quasi-inductive science. Notably, John Worrall and Elie Zahar, the editors of *Proofs and Refutations*, acknowledge that Lakatos's contribution should be placed against the background of Pólya's revival of the 'art of mathematical discovery' and mathematical heuristic. Moreover, it was Pólya himself who suggested the historical case of Euler's conjecture as a topic for Lakatos's PhD thesis in Cambridge—as it is documented, among many other interesting connections—by the Pólya and Lakatos correspondence in the Lakatos archive at the London School of Economics. Another piece one may have expected to find in Kadvany's well assembled puzzle is a discussion of Lakatos's Hegelianism in connection with much of the revival of some aspects of Hegel's rationalism, which is now interestingly taking place in the United States, by philosophers such as Rorty, McDowell, and Brandom. Despite the fact that the reader will not satisfy the latter curiosity, the book is well written, eminently readable, and stands out as a major contribution between the boundaries of continental and Anglo-American philosophy of science and mathematics.

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RICHARD SWINBURNE, editor. **Bayes's Theorem**. Proceedings of the British Academy **113**. Oxford: Oxford University Press, 2002. ISBN 0-19-726267-8. Pp. x + 149.

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RICHARD SWINBURNE, Introduction, pp. 1–20.
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Announcements

The Editor has learned from the Editors of *The Philosopher's Annual*, the twenty-fourth volume of which will be published by the Center for Studies in Language and Information at Stanford University, that they have selected Ignacio Jané's paper, 'Reflections on Skolem's Relativity of Set-Theoretical Concepts', published in Volume 9, as among the ten best published in philosophy in the year 2001. It is to be included in their anthology (http://129.49.17.140/pa/index.htm). Congratulations to Prof. Jané.

The arrangement by which *Philosophia Mathematica* has been distributed for several years by *Wilfrid Laurier University Press* will end between the distribution of this issue by them and the distribution of the next issue. In the interval between the end of April and the distribution of the next issue, all correspondence concerning the journal should be directed to the Editor, whose postal address until the end of June will be Wolfson College, Oxford OX2 6UD England, and whose normal e-mail address continues to work during his absence from Winnipeg. The late distribution of the final issue of 2002, which the Editor regrets, was due to a strike at Wilfrid Laurier University. The whole print run of the issue was stored, through the kindness of the Department of Philosophy of the University of Waterloo, in their facilities for the duration of the strike. Thanks to them.

Kadvany, John

Imre Lakatos and the guises of reason.

Durham, NC: Duke University Press, (ISBN 0-8223-2649-3/pbk; 0-8223-2660-4/hbk). xx, 379 p. $ 23.95/pbk; $ 69.95/hbk (2001).

In 1957 Imre Lakatos fled from Hungary to England. In the 1960s he became famous with the publication of 'Proofs and Refutations' (based on his Cambridge Ph. D. thesis and reprinted by Cambridge Univ. Press (1976; Zbl 0334.00022)) in which he argued that mathematics is not a collection of infallible truths developing in a cumulative way, but, that on the contrary, mathematical theories are constantly being refuted and replaced by others. Lakatos views can be seen as an extension to mathematics of Karl Popper's work with respect to scientific theories. At the end of the 1960s, in a reaction to Thomas Kuhn's 'The Structure of Scientific Revolutions' Lakatos developed his 'Methodology of scientific research programmes' [cf. Cambridge Univ. Press (1978; Zbl 0373.02002)]. Both the methodology of proofs and refutations and the methodology of scientific research programmes are attempts to capture the rationality of the development of mathematics and science. Usually Lakatos' work is rightly interpreted as part of Anglo-Saxon philosophy [cf. *T. Koetsier*, Lakatos' philosophy of mathematics. A historical approach. North-Holland (1991; Zbl 0743.00017)]. Yet, before Lakatos came to England, he had spent the first 34 years of his life in Hungary. He had been active in the communist party and he had been in a communist jail for three years for reasons that remain unknown. Moreover, he had studied the works of Marx and Engels and had undergone the influence of the influential Hungarian marxist philosopher Georg Lukacs.

In this fascinating book the author attempts in considerable detail to relate in various ways Lakatos' Anglo-Saxon philosophical work to his Hungarian past. Lakatos had read Lukacs's 'History and Class Consciousness' and acquired a Hegelian-Marxist view of science: the views of a scientific community can only be understood as a historical cathegory and as part of a dialectical development. Moreover, Lukacs's 'The Destruction of Reason' and the practice of Hungarian Stalinism had shown him how the idea of criticism building knowledge through solutions to contradictions could be easily perverted. Stalinism reduced dialectics to a forced admitting of one's errors often before being eliminated. For example, Kadvany points out that Lakatos's method of proofs and refutations is strikingly similar to Hegel's phenomenology of the spirit; the neutralisation of a counter-example by means of the method of lemma-incorporation is 'aufheben' in the Hegelian sense of the word. Hegel described his own philosophy as the final stage in the history of philosophy. Analogously Lakatos described his methodology of scientific research programmes as the natural outcome of a dialectical development in which successively more powerful methodologies succeed each other. Lakatos was in fact a "classic Hungarian Stalinist intellectual of the postwar area" (p. xvi). Kadvany's reconstruction of the intellectual development of Lakatos' s thinking is very convincing: it is clear that it is necessary for a full understanding of Lakatos's philosophical work to take his Hungarian past into account.

Two chapters of the book are devoted to new rational reconstructions along Lakatosian lines. Chapter 4 contains a history of 'monster barring' and 'lemma-incorporation' for Gödel's second incompleteness theorem. Chapter 11 argues that Marxist economics qualified as a research programme and as such must be considered as scientific from a Lakatosian point of view. The last chapter of the book is an intriguing attempt to understand Hungarian history between World War II and the failed revolution of 1956 by means of Lakatos's philosophy.

Teun Koetsier (Amsterdam).

MATHEMATICAL REVIEWS

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This is an account of the work (and life) of Imre Lakatos (1922–1974), the brilliant but enigmatic Hungarian refugee who became an important philosopher of mathematics and science. His importance in the philosophy of mathematics rests primarily on his book *Proofs and refutations* [Cambridge Univ. Press, Cambridge, 1976; MR 58 #122], which elaborates two themes: the historical process whereby mathematical knowledge is developed and warranted and the consequent fallibility of all mathematical knowledge. Kadvany's book is the first fully to explore the import of Hegel's dialectics, and central European thinking in general, in Lakatos' work. This is the deliberate aim of the book, and it succeeds admirably in this goal with considerable thoroughness, depth and insight, culminating in Table 1 (pages 294–5), which identifies 18 Hegelian (or Marxist) themes in Lakatos. In the course of discussing Lakatos' views on the uniformalizability of informal mathematics, Kadvany also treats Gödel's theorem with insight and subtlety.

This book is an important contribution to the literature on Lakatos. It provides significant insights into the background, nature, import and implications of Lakatos' thought. However, it is not yet the definitive work on Lakatos' philosophy or even his philosophy of mathematics, for two reasons. First of all, like too many commentators, Kadvany draws exclusively on Lakatos' posthumous publications (including the two edited volumes of papers published in 1978) as a source of Lakatos' writings. There is a significant shift in Lakatos' thinking between his 1961 Ph.D. thesis and his 1963–64 papers based on his thesis (when he concealed the Marxist-Hegelian roots of his thought). Furthermore, his 1976 book based primarily on these papers is the work of two editors out of sympathy with Lakatos' early fallibilism (and Hegelianism). Any definitive study of Lakatos' thought cannot therefore rely solely on this last, posthumously edited work as a source for his main case study and contribution to the philosophy of mathematics. Secondly, in the book Kadvany is primarily advancing his thesis about the Hegelian underpinnings of Lakatos' work. He does this admirably, but this is a controversial position and he does not consider the disanalogies between the two thinkers. Although I am convinced he is largely right, a skeptic might argue that Lakatos gave up his Hegelian roots for a Popperian position (as indeed several commentators believe). This view is not adequately countered. As this point illustrates, Kadvany does not do full justice to the extensive literature that has built up explicating and commenting on Lakatos' work. For these reasons, the work cannot be regarded as definitive.

Nevertheless, this is the most important book that has appeared on Lakatos' work to date, and it contains much that is novel and of real interest and importance to philosophers and mathematicians. Every university library should have a copy.
Paul Ernest (4-EXTRED; Exeter)