

Philosophy, Science, and (Anti-)Communism: The Two Lives of Imre Lakatos*

Critical notice of George Kampis, Ladislav Kvasz, and Michael Stöltzner (eds.), *Appraising Lakatos. Mathematics, Methodology and the Man*, Kluwer: Dordrecht - Boston - London, 2002

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Thirty years after the untimely death of Imre Lakatos, the enduring influence of several Lakatosian issues and ideas asks for a systematic appraisal of his work. A significant step in this direction has been made in two workshops, organized by the Institute Vienna Circle and the Institute for History and Philosophy of Science of Eötvös University, which were held in Vienna and Budapest in autumn 1997. The workshops resulted in the present substantial (382 pages) volume, which includes seventeen papers dealing with Lakatos' philosophy and biography and several documents and photographs about his work and life. The papers have been divided into three sections, concerning Lakatos' philosophy of science (Section I) and mathematics (Section II), and his intellectual and political biography (Section III).

The contributions collected in Section I deal especially with Lakatos' methodology of scientific research programmes – henceforth, MSRP. The conceptual skeleton of MSRP can be described as follows. A scientific research programme takes the form of a series of successively developed theories sharing a hard core and a positive heuristic. The hard core consists of hypotheses that are irrefutable within the programme, while the residual hypotheses, i.e.

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the ‘protective belt’ of the programme, can be modified in response to the experimental outcomes; the search of appropriate modifications is guided by the so-called positive heuristic. If a programme generates new predictions, and such predictions are confirmed, the programme is progressive. A scientific community is rational only if it embraces the most progressive research programmes. The main issues about MSRP discussed in the contributions to Section I are the following: (1) the MSRP-solution to the Duhem problem and Lakatos’ analysis of the role of crucial experiments; (2) the notion of positive heuristic and, more generally, the possibility and the nature of a genuine logic of scientific discovery; (3) the adequacy and the justification of the MSRP-rules governing theory choice decisions.

According to the Duhem thesis, the experimental observations made to test a theoretical hypothesis presuppose the acceptance of a network of auxiliary hypotheses. The Duhem thesis seems to imply, among other things, that the falsification of an isolated hypothesis is impossible, that Popper’s falsifiability criterion is inadequate, and that falsifying crucial experiments are impossible. Moreover, the Duhem thesis poses the following further problem: given an experimental outcome conflicting with a group of hypotheses, which of them should be changed? Since MSRP is, to a great extent, motivated by Lakatos’ criticisms of Popper’s falsificationism, and such criticisms are based fundamentally on the Duhem thesis and the related Duhem problem, one might see MSRP as an elaborated solution of the latter. The MSRP-solution to the Duhem problem amounts, roughly speaking, to the claim that, while the hypotheses included in the hard core of a research programme should be considered as experimentally irrefutable, any hypothesis belonging to the protective belt is a good candidate to refutation. A discussion of the MSRP-solution to the Duhem problem, and of Lakatos’ views about crucial experiments, is provided in the contributions by Donald Gillies and Péter Szegedy. Gillies agrees with Lakatos that Popper’s philosophy needs to be modified in the light of the Duhem thesis, but argues that the Duhem problem should be solved in a way different from that suggested in MSRP. Szegedy analyses the role of a series of crucial experiments, such as the famous Aspect experiment, in the competition among different interpretations of quantum mechanics, where such interpretations are construed as research programmes characterized by a permanent hard core. His conclusion, that none of the mentioned experiments is a genuine crucial experiment, supports Lakatos’ general claim that there are no such things as crucial falsifying experiments.

Lakatos’ work on the philosophy of mathematical and empirical sciences is inspired by the assumption that there is a genuine, rationally reconstructible

logic of discovery. Although the fortune of Lakatos' philosophy and, in particular, of his notion of positive heuristic, allows to consider him as one of the fathers of contemporary logic of discovery, one might wonder whether positive heuristic is something more than a fascinating metaphor. In his essay, John Worrall remarks (p. 88) that, "on reviewing Imre's published work, it is difficult to see how [his] reputation could have been based soundly on anything that found its way into print", since even his notion of positive heuristic "is very sketchily presented in his famous papers on MSRP". On the other hand, Worrall shares Lakatos' view that the process of discovery can be rationally reconstructed; indeed, his paper provides a constructive contribution to logic of discovery. After examining three historical episodes, related to the theoretical breakthroughs made in optics in the early 19th Century by Augustin Jean Fresnel, Worrall argues that such episodes can be reconstructed by the method of 'deduction from the phenomena,' which allows to deduce hypotheses from the phenomena plus background knowledge.

The debate on theory change and scientific progress, enfolded by Thomas Kuhn's work, dominated philosophy of science in the 1960s and 1970s. Most of the participants in such a debate shared the idea, which is constitutive of Lakatos' approach, that rational theory choice and scientific progress are intimately related; in fact, scientific progress is given by a series of rational theory choice decisions. Theory choice decisions were at the focus of the debate; in particular, the essays by Martin Carrier, Gábor Forrai, Matteo Motterlini, and John Watkins focus on the problem of the adequacy and the justification of the MSRP-rules governing theory choice decisions.

Since it provides, among other things, a rational reconstruction of some of Kuhn's allegedly descriptive generalizations about scientific change, Lakatos' analysis of scientific enterprise can be considered as a response to Kuhn's challenge. Starting from Lakatos' assumption that methodologies have a historical bearing, so that their performance is subject to quasi-empirical scrutiny, Carrier compares Kuhn's and Lakatos' approaches, by reconstructing them as methodological research programmes. More precisely, Carrier tests the consequences of Kuhn's and Lakatos' methodologies in terms of the corresponding theory choice decisions, and concludes (p. 68) that, although it cannot explain the existence of Kuhn losses, in any other respect Lakatos' methodology is better than Kuhn's approach "as an account of scientific change by its own methodological lights".

According to Lakatos, a historically-based normative methodology should satisfy two conditions: (i) methodological rules should be objective, universal, and explicit; (ii) they should be identified and justified by looking at the his-

tory of science. Given a historical justification of methodological rules, one may wonder whether they can also be justified in purely epistemological terms. A justification of this kind might consist in showing that methodological rules are functional to the achievement of the epistemic goals of science. For instance, Lakatos suggests that the MSRP-rules for the acceptance of scientific theories can be justified by showing that the growing empirical success, or corroboration, of the accepted theories is a sign of their increasing verisimilitude, i.e., of their increasing approximation to objective truth.

The neo-Hegelian Lakatos portrayed by Hacking (1979) develops a methodological account where the notion of truth as correspondence to the facts is replaced by scientific method, and the real aim of science is not (the approach to) the truth but, rather, the growth of knowledge, guaranteed by the application of the MSRP-rules. Motterlini convincingly argues (p. 44) that Hacking's influential interpretation of Lakatos' methodology is, to say the least, one-sided, since "the late Lakatos could not have regarded methodology as a substitute for truth because he explicitly demanded a connection between the 'game of science' (method) and its 'rational' end (truth)".

The relations between corroboration, verisimilitude and induction were the main issue of the famous Popper-Lakatos rift, which started as an intellectual disagreement but very soon escalated into a bitter quarrel. Although this dispute may be legitimately considered from the perspective of the World 2 of philosophical debates, Watkins examines it within the framework of the World 3 of conceptual relations, in order "to find out what revisions, if any, to the propositional content of Popper's philosophy of science are called by Lakatos' challenge" (p. 5). (Watkins suddenly passed away on July 26th, 1999, about two years after Vienna and Budapest workshops; to my knowledge, the article included here is his last published paper.) The late Lakatos was convinced that the corroboration-based estimates of the verisimilitude of scientific hypotheses had an inductive character, due to the fact that "a corroboration appraisal as understood by Popper sums up how a theory has performed so far and says nothing about future performance", while "verisimilitude appraisals have no temporal restriction" (p. 7). More specifically, he claimed that the link between corroboration and verisimilitude could be adequately described by some sort of synthetic inductive postulate. Although Popper was understandably reluctant to explicitly acknowledge the methodological necessity of some inductive principles in science, he seems to have understood the role of conjectural estimates of verisimilitude as early as between the 1950s and 1960s, when he was working to the paper later published in *Conjectures and Refutations*. Indeed, in his answer to Lakatos, Popper (1974, p. 1011) claims: "I *did* suggest in *Con-*

jectures and Refutations, Chapter 10, that the degree of corroboration may be taken as an indication of verisimilitude”. According to Watkins (p. 7), “that little sentence means that the propositional content of Popper’s earlier publications already contained the inductive postulate called for by Lakatos”, and that “the whiff of induction which Lakatos invited Popper to introduce into his philosophy was already there”. Watkins concludes (p. 10) that “very little revision to the propositional content of Popper’s philosophy seems to be obligated by the criticisms by Lakatos”; in fact, “their main result was to provoke Popper into that veiled admission that he *had* introduced an inductive assumption”.

Although Watkins’ essay sheds light on several important features of the Popper-Lakatos rift on corroboration, verisimilitude, and induction, it seems to me that it underestimates its propositional content. A better understanding of the dispute can be achieved by integrating Watkins’ account with the remarks on the same subject made by Niiniluoto (1989) on August 1986, at the International Conference on *Imre Lakatos and Theories of Scientific Change* held in Thessaloniki (Greece). (Strangely enough, Niiniluoto’s paper is not mentioned by Watkins, although he is the only one, among the contributors to the volume reviewed here, who participated to the Thessaloniki Conference.) Niiniluoto, indeed, considers two substantial, and related, points on which Lakatos disagreed from Popper: (i) According to Lakatos, Popper’s admission that the degree of corroboration of a theory may be an (inductive) indicator of its degree of verisimilitude was dramatically insufficient for the formulation of an adequate fallibilistic methodology. Indeed he believed that the link corroboration-verisimilitude had to be precisely reconstructed by appropriate inductive principles, providing plausible corroboration-based estimates of the verisimilitude of the scientific hypotheses, *even if already falsified*. (It should be recalled that, in practice, Lakatos never specified such principles; perhaps, as Forrai suggests (p. 82), “he regarded this task as formidable – or he simply died before he could get down to it”.); (ii) Lakatos realised that the inductive principles of the requested kind could not be stated in terms of Popper’s notions of corroboration and verisimilitude. More precisely, he was aware that Popper’s measure of corroboration was not a good indicator of verisimilitude; in fact, if such a measure is adopted, any experimentally falsified hypothesis receives its minimum value. Apart from making impossible any corroboration-based choice among falsified hypotheses, Popperian corroboration violates a natural condition, taken from scientific practice, according to which it may happen that a hypothesis is falsified by evidence *e* but, at the same time, is considered to be highly verisimilar on the basis of *e*. For these reasons, Lakatos (1968, pp. 384-385) introduced a corrected version of Popper’s corroboration

which assigns positive degrees of corroboration even to refuted theories (see also Lakatos 1974, p. 270, note 122).

It is not clear whether Lakatos realized that also Popper's notion of verisimilitude was seriously inadequate. In any case, he died too soon to appreciate the consequences of the theorem discovered, in 1974, by David Miller and Pavel Tichý, who independently proved that, according to Popper's definition, a false theory can never be closer to the truth than another one. This negative outcome opened the road to the post-Popperian theories of verisimilitude, emerged since 1975. A large part of the work in this field can be seen as a response to the late Lakatos' challenge to identify inductive principles linking corroboration and verisimilitude in the appropriate way. For instance, Niiniluoto (1987) formulates a comprehensive view of scientific inference where a non-Popperian approach to verisimilitude is combined with the theory of inductive probabilities developed within the Carnap-Hintikka tradition. Also the so-called evaluation methodology, recently proposed by Kuipers (2000), where (also falsified) theories are judged in terms of their successes and problems, is explicitly motivated by Lakatos' idea that theory evaluation has a primarily comparative character, leaving falsified theories in the game as long as there are no better alternatives. Although the influence of Lakatos' ideas on the post-Popperian theories of verisimilitude is not examined in the contributions to the present volume, it is an important part of the Lakatosian philosophical legacy, which seems to deserve further research.

After working, between the end of the 1950s and the early 1960s, on *Proofs and Refutations* – henceforth PR – Lakatos came back on philosophy of mathematics in many occasions, until the last years of his life, when he was seeking to apply MSRP to mathematics, and to integrate it with the conceptual framework of PR. The seven papers collected in Section II can be seen as a sign of the recently revived interest in Lakatos' philosophy of mathematics.

Lakatos opposes to the view that mathematical concepts should be conceived of as immutable Platonic entities, and puts a strong emphasis on conceptual change in mathematics. By neglecting any speculation about the hidden nature of mathematical objects, he focusses on mathematical practice as such, in the attempt to develop a methodology of mathematical sciences able to shed some light on the processes underlying conceptual change and discovery in mathematics. Several issues concerning Lakatos' views about this subject are discussed in the articles by David Corfield, Thomas Mormann, Olga Kiss, and Ladislav Kvasz.

According to Lakatos, the most important mathematical knowledge is embodied in the theoretical statements accepted as a result of the process of math-

ematical discovery, and the axiomatisation of such statements is the end of the creative process in mathematical research. Corfield considers this view as a residual streak of logical empiricism, and argues (p. 117) that “axiomatisation is not the end of the road”, since it allows “plenty of room for further disagreement” about “the direction of research, [...] which way to think about a theory, which way to generalise a concept, and so on”. Corfield’s interest in conceptual change ‘after axiomatization’ is shared by Mormann. While Lakatos applies his ideas of concept-formation and concept-stretching only to informal mathematics, Mormann contends that the role of conceptual variation is even more important in axiomatic mathematics. Indeed, one of the main purposes of his paper is to generalise Lakatos’ analysis of conceptual variation, in order “to sketch an evolutionary theory of mathematical knowledge, which takes axiomatic variation of concepts as the fundamental driving force of the ongoing evolution of mathematics” (p. 139). Lakatos’ idea that mathematical discovery is driven by a rationally reconstructible heuristic is borrowed from the Hungarian mathematician George Pólya. Pólya and Lakatos’ approaches to mathematical heuristic are compared by Kiss. He points out (p. 248) that Pólya’s *Induction and Analogy* (1954) and Lakatos’ PR “can be read together, as if they were two parts of the same story”: while Pólya is concerned with how mathematicians *find* plausible mathematical conjectures, Lakatos is concerned with how they *prove* them. In terms of discovery, Pólya focusses on the discovery of mathematical conjectures, and Lakatos focusses on the discovery of rigorous proofs of such conjectures. Kvasz argues (p. 211) that, if dialectic is construed “very broadly, as a current of philosophical thought which tries to interpret the growth of knowledge using a prescribed pattern of stages, methods, or laws of development of knowledge”, then Lakatos’ methodology is properly dialectical. More precisely, it exhibits all the three main “dialectical faults” (p. 212), i.e., the existence of prescribed patterns of conceptual change, their logical nature, and their universal character. Kvasz attacks the dialectical side of Lakatos’ approach by showing that the basic methodological patterns outlined in PR and MSRP are far from being universal, and can be supplemented by further ones.

Section II is completed by three fine essays dealing with the implications of Lakatos’ work for the foundations of mathematics (Teun Koetsier), the interactions between mathematics and modern mathematical physical science (Michael Stöltzner), and the relevance of philosophy of mathematics to mathematical teaching (Christian Reichel).

Lakatos’ intense life appears as the combination of two completely different lives. He spent his first 34 years almost entirely in Hungary, until Novem-

ber 1956, when he left the country, following the Soviet crushing of the short-lived Revolution. After two months he was in Cambridge pursuing a Ph. D. in philosophy of mathematics with R. D. Braithwaite, and within three years he was working with Karl Popper in London. The papers collected in Section III, which were presented in the Budapest workshop by László Ropolyi, Jancis Long, and Lee Congdon, provide an excellent occasion for assessing Lakatos' intellectual formation and his human and political biography in the two halves, the Hungarian and the English, of his life.

The authors dealing with the dialectical ingredients of Lakatos' philosophy often construe 'dialectical' in a rather broad sense, by neglecting the details of Lakatos' dialectical apprenticeship, within the Hegelian-Marxist tradition. Such apprenticeship is the main subject of the essay by Ropolyi, who traces Lakatos' dialectical views back to the philosophical and political ideas he embraced in the 1940s and 1950s in Hungary, when he was heavily influenced by Georg Lukács. After arguing that a distinctive feature of Lukács' version of the Marxist dialectic is his rationalist view of the coincidence of rationality and progress, according to which rationality is the systematic attempt to choose progressive solutions to problems, Ropoly claims that Lukács' view of rationality was completely absorbed into MSRP. This allows him to conclude (p. 334) that, in spite of his dramatic political changes and his rebuttal of communist ideology, "with regard to methodology [...] Lakatos moved his whole life in a Lukácsian framework".

The Hungarian part of Lakatos' life was largely unknown until the Budapest workshop (30-31 October 1997), which provided a unique occasion to reconstruct some disturbing aspects of his political activities. In fact, since Lakatos was born on November 9th, 1922, the workshop was very close to what would have been his 75th birthday; thereby many of his contemporaries were still alive at that time, including some who suffered from his political deeds. In a detailed reconstruction of Lakatos' life in Hungary, Long tries to explain why Lakatos was 'the unforgiven' for almost all his Hungarian acquaintances. Lakatos' activities as a warm Stalinist are not a sufficient explanation for such a virulently bad reputation in Hungary so many years after his death, since many people were engaged in the arising of a Stalinist system in Hungary and they *were* forgiven; on the other hand, a number of stories which seem to reveal Lakatos' inclination to do harm to other people suggest a plausible explanation.

When, on March 1944, Germany invaded Hungary, the Marxist study group organized by Lakatos during 1943 became a tightly organized communist cell, where Lakatos assumed the right to control group members. In May a 19-year-

old Jewish girl, named Éva Iszák, joined the group. Following some difficulties in finding her an adequate clandestine lodging, Lakatos came to the conclusion that she would very likely fall into Nazi hands and be forced to betray the rest of the group; thereby, he decided that her duty to the group and to communism was to commit suicide. In some impressive pages, Long tells us how Lakatos proposed the suicide and pressured all parties into carrying it out. Between May 1945 and December 1948, Lakatos helped establish Hungary's communist state. In spite of his young age, his contribution was so effective that many people considered him as a sort of grey eminence of the Communist Party in the field of culture and education. A salient enterprise carried out by Lakatos in this role is his contribution to the destruction of Eötvös College. In February 1947 Lakatos, who was student at Eötvös, opened a systematic attack against his College, by arguing that the Director and most teachers were unable to train the new intelligentsia. In the end the Director was replaced and the teachers who appeared on Lakatos' list were fired. Lakatos could not enjoy much the result of his action, since during the years 1949-1953 Hungary was plunged into a Stalinist nightmare and he shared the destiny of many other enthusiastic comrades. On September 1950 he was lead to Recsk, the infamous labor camp which reproduced the gulag in Hungary's Matras hills. Although the reasons of his staying there are still obscure, it seems likely that his bad luck under the new system was at least partially due to his ultra-Stalinist fanaticism. In any case, there is no doubt that the worst aspect of Lakatos' experience in those years is the circumstance that, since his discharge from prison, on September 1953, he had an agreement with the police to provide information on his best friends.

The renewed interest for politics exhibited by Lakatos about ten years after his arrival to England is the main subject of Congdon's article. Lakatos discovered that he was still excitable politically during the summer of 1966, in response to the student revolt at the LSE. In this occasion he strongly opposed the recommendation that students help to direct the academic policy, by arguing that what the radicals really wanted was "the winning of power that would enable them first to destroy universities as centers of learning and then, in their place, to create centers for the dissemination of social and political propaganda" (p. 342). Being determined to save the LSE from a fate similar to that he had imposed upon Eötvös College, he effectively helped "stiffen the authorities' backbone" (p. 344). Lakatos' views about international politics were characterized by a sharp anti-Sovietism; he was in favour of a strong Western initiative, also on military ground, and warmly supported U.S. actions in Vietnam. In 1972-1973 Lakatos enunciated the project to work on political

philosophy, but he died before he could realize it. Congdon suggests, quite reasonably, that Lakatos, in formulating his own political philosophy, intended to adapt the basic ideas of MSRP, and guesses (p. 347) that he would have developed a theory not very distant from “the slightly left of center ‘Open Society’ liberalism of his quondam friend Karl Popper”.

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