

INTRODUCTION

The present collection is the result of a cooperation between the Institute Vienna Circle and the Institute for History and Philosophy of Science of Eötvös University, Budapest, which was dedicated to the philosophy of science in the Austro-Hungarian context. Probably no other protagonist of 20th century philosophy of science fits better into such a framework than does Imre Lakatos (1922–1974). The book *Proofs and Refutations* which made him famous, declares itself as a continuation of György Pólya's works on mathematical heuristics and plausible reasoning and, accordingly, stands in the eminent tradition of Hungarian mathematics. When Lakatos subsequently embarked upon general philosophy of science and developed his methodology of scientific research programs (henceforth MSRP), he became involved in at times heated debates with three offshoots and opponents of the Vienna Circle: Karl Popper, Thomas S. Kuhn and Paul Feyerabend. Before giving a short overview of the present volume, we shall briefly sketch this historical setting in order to illustrate the motivation of the Institute Vienna Circle to start its new book series with a volume on Imre Lakatos.

After completing his Cambridge Ph.D. dissertation in 1961, Lakatos came to the London School of Economics to work under Popper. He subsequently attempted to extend – though with nuances of his own – Critical Rationalism to mathematics. Seeking more and more an independent stance in the late 1960s, Lakatos' relationship with Popper developed into a thematic rift, culminating in personal tensions. Lakatos' recently published last lectures are quite telling in this respect. Nevertheless, both Lakatos and Popper stood side by side in struggling against the 'new epistemology' of the 1970s. While they emphasized the unavoidability of a criterion demarcating science and scientific rationality from non-science, the 'new epistemologists' – among them Thomas Kuhn and Paul Feyerabend became the most prominent – insisted on the indivisibility of the whole of scientific practice, in particular on the impact of societal factors, institutions, ideologies, etc., upon scientists and their research programs. They held that – even for philosophical purposes – the actual course of history could not be replaced by a rational reconstruction of history, and that there existed no methodology guaranteeing scientific success. Hence no absolute justification of scientific rationality could be reached.

During the last two decades, historical investigations into Logical Empiricism have brought to the fore various historical facts pertaining to the battles waged during the 1960s and 1970s. On the one hand, Popper's relations with the Vienna Circle were much more complex than his claims to the effect that he had simply 'killed' Logical Positivism suggest; in particular, the *Logic of Scientific Discovery* played its part in the movement's discussions during the 1930s. Victor Kraft, who was, together with Béla Juhos, the last local representative of the Vienna Circle after 1945, shared some of Popper's core ideas. In 1956, Kraft recommended Lakatos to Cambridge to obtain a second Ph.D. under Braithwaite. The correspondence between Lakatos and Kraft preserved in the Lakatos Archive at LSE indicates that Kraft was basically the only Vienna Circle member whose writings – apart from Carnap's of course – Lakatos had thoroughly studied. Lakatos especially appreciated Kraft's early philosophy of mathematics.

On the other hand, Kuhn's seminal book *The Structure of Scientific Revolutions* appeared in the *International Encyclopedia of Unified Science*. When Otto Neurath had launched this project in the mid 1930s, he did so in the attempt to replace *the* system of science by an ongoing cooperation of scientists in the Vienna Circle's spirit. Because of the war and Neurath's untimely death in 1945, a tiny core of 19 booklets, along with bibliography, were the only elements of his enormous plan to make it into print until 1970. A closer look at the writings of Logical Empiricists after 1945 reveals that many Kuhnian themes were not unfamiliar or outlandish to that movement. Yet neither Philipp Frank's nor Otto Neurath's respective activities became widely known until the fairly recent Neurath renaissance. Paul Feyerabend, a physics student in post-war Vienna, started his philosophical career in Kraft's circle. In a way, his "anti-system" and "anti-method" crusades can be seen as pointedly exaggerating Neurath's criticism of Popper's pseudo-rationalism.

A quarter of a century after Imre Lakatos' untimely death, and more than a decade after the hitherto immense popularity of Lakatos-style case studies has significantly decreased, it seems to be a suitable moment – and at a sufficient distance – to critically reevaluate the old debates: Is our historical picture of the classical controversy over scientific rationality still adequate? Are Lakatos' methodological proposals, above all the MSRP, still promising today, and can they be suitably refined so as to accommodate the lessons of the large number of detailed case studies ensuing from them? Or do they contain limitations and deficiencies in principle? Discussion, thus, of possible excess content – to phrase it in Lakatosian terms – will be one of the objectives of the first section of the present collection. Although the history of philosophy of science is itself presently becoming a research program, the goal of the papers assembled therein is not merely retrospection. To the

contrary, the so-called ‘science wars’ ensuing from the Sokal hoax taught us that good arguments in defense of scientific rationality are still timely. Present combatants sometimes reveal a certain reluctance to draw lessons from classical debates. In this respect, this section might be a useful reminder of a former state of the art. Moreover, Lakatos’ thinking still bears unexplored perspectives. He was a philosopher of many roots, some of which, such as the thinking of Hegel and Lukács, constitute a rather atypical background for a 20th century philosopher of science, especially for one who had started out in mathematics.

Recent publications on Lakatos in scientific journals demonstrate, above all, a revived interest in his philosophy of mathematics which represents one of those few approaches that are not centered around (or limited to) foundational issues, but center around mathematical practice as such. On this, the second section focuses. After all, Lakatos regarded himself primarily as a philosopher of mathematics. During the last years of his life, he was seeking to apply the MSRP to mathematics. Although in some papers from the 1970s one finds footnotes commenting upon *Proofs and Refutations*, Lakatos could not close the circle himself, and his papers do not provide a real clue about his plans. Today, it seems clear that major modifications in both the MSRP and his philosophy of mathematics are required to reach that goal. Mathematics is much more finely subdivided into sub-disciplines than are the empirical sciences. On the other hand, mathematical research is not so strongly concentrated around a small number of problems such as, say, hunting the Higgs particle or deciphering human DNA. More generally, mathematicians typically do not dispute a common set of facts. Instead, aesthetic criteria, such as conceptual simplicity or the beauty of a proof, essentially determine the quality of a mathematical argument; and they are typically at issue whenever mathematicians debate whether a theorem is not only true but really final, or whether we have fully understood a mathematical structure. Interestingly, the Hungarian tradition of mathematics to which Lakatos is indebted through György Pólya, Alfréd Rényi, and Arpád Szabó was much more problem-oriented than, for instance, the various French or German schools. Especially in Pólya’s writings, heuristic beats justification by far. This stance not only opens many interesting perspectives for the connection between mathematics and the sciences, but is also most attractive in mathematics teaching.

Lakatos’ philosophy emphasizes mathematical growth and conceptual evolution over the justification and consolidation of a theory’s structure. But in his charges against Euclideanism, and through the all-pervasive fallibilism behind them, the Lakatosian dialectics of proofs and refutations visibly overshoots the mark. Although mathematical rigor is indeed often suspended in the early phase of a budding research program, and although understanding may play a role far more important than justification, the standards of rigor furnished by a commonly accepted metatheory unite the variety of mathematical sub-disciplines. Ultimately, all doubts will be cast on

the axioms. Already the rift between the first and the second parts of *Proofs and Refutations* reveals that Lakatos was at odds with the axiomatic method, which utterly characterizes 20th century mathematics. For many modern concepts and theorems – even for those which have found applications in physics – there simply are no informal ancestors. Still, most mathematicians maintain that mathematical intuition must somehow precede proof. If this problem could be remedied, Lakatos' quasi-empiricism might be rather promising for assessing the spectacularly successful encounters between mathematics and theoretical physics.

In Lakatos' mature thinking, some apparently contradictory influences have merged, including Hegel and Popper, mathematics and critical fallibilism. Interestingly, some core themes, such as the idea of research programs, are foreshadowed already before his emigration. Both tendencies can well be seen from the paper "Modern physics, modern society" that was published in Hungarian in 1947. There, a rather standard Communist exercise in ideology suddenly develops into a discussion of L. Susan Stebbing's *Philosophy and the Physicists*. We provide here a full translation of this text mainly because it represents a major part of Lakatos' Hungarian Ph.D. dissertation defended in the same year. The dissertation as a whole is missing in the University archives at Debrecen, but the opinion of his supervisor Sándor Karácsony proves that "Modern physics, modern society" represented its first part. We thank Gábor Kutrovácz for translating both documents into English. The documentary section is rounded off by a fairly complete bibliography of Lakatos' Hungarian papers written prior to his emigration in 1956. Discussing the philosophical import of Lakatos' text, the different personal histories of the editors came to the fore. To a Western reader, both parts are somewhat separated, and historical distance renders them mainly just a document. Having been constantly imbued with – and often suffered under – the idea that there are deterministic laws governing class history in the same sense as Newtonian mechanics, the East-European reader gains quite another picture.

Until his imprisonment in 1950, Lakatos was a radical communist who considered his own deeds – "unforgivable" as they appear today – to be part of a historical process governed by dialectical laws, which could be rationally reconstructed. While such a parallel must not be overstressed, it does provide an interesting perspective from which to start studying Lakatos' biography. To be sure, only few members of his generation had the boring sort of biography that philosophers are alleged to have. Yet Lakatos' was exceptionally rich in curves. There have been many intellectual émigrés from the communist East, but only a few of them made such a significant shift from the far left to the far right. The rupture in his biography became almost tantamount to meeting two personalities. His earlier political involvement were stories he hardly ever told anybody in the West. As rumors today abound, a comprehensive volume on Lakatos has to tell them and contrast them to his political activity at LSE. But there is more at stake than just being comprehensive. The historical investigations into scientific philosophy in

exile have set a high standard in contextualizing this tradition with the general history of intellectual emigration. As an Austro-Hungarian joint project, the final section of this volume intends to provide a certain basis for undertaking similar scrutiny with Lakatos in the future.

The present volume emerged from two workshops which were held in Vienna, from 12–14 September 1997, and Budapest, from 30–31 October 1997. The second was very close to what would have been Lakatos' 75th birthday, which provided an excellent occasion for assessing the genuinely Hungarian aspect of his personality. Many contemporaries of his are still alive; some of them joined forces with him, and some suffered from his deeds. We held a panel discussion moderated by Lee Congdon, in which took part Alex Bándy, Alex Bellamy, György Litván, Jancis Long, Sándorné Kántor, Gábor Palló, Éva Pap, László Ropolyi, Miklós Szabolcsi, and Gábor Vajda. Panelists also reported on their experiences and difficulties in securing biographical material on Lakatos. But at the core of the exchange were the recollections of Lakatos' political activities, and of science policy of the 1950s, in general. So this event, in a way, became a part of Hungary's coming to terms with its Communist past. The fact that our initial plan to hold this discussion in the Eötvös Collegium – an institution which was closed down under the influence of its former student Imre Lakatos – was first accepted and then turned down by its current Director, is a clear sign how present this past is still for many. For a certain time, the editors considered reproducing selected passages from the tape of his panel discussion in the present volume. We refrained from doing so because a substantial part of the facts presented there is contained in Jancis Long's contribution, and the 'event-like' character of the panel discussion cannot be put into print.

A series of photographs of Imre Lakatos from different epochs of his life completes the volume. The pictures show him with his second wife Éva Pap, in scientific and political company. We are very grateful to Éva Pap for granting us permission to publish these photos from her personal archive for the first time. She holds the copyright for all of them.

On July 26th, 1999, Professor John Watkins suddenly passed away. It had been a great honor for us that he accepted our invitation to the Budapest workshop and we well recall his talk and the most interesting personal remarks about the linkage of Imre Lakatos' two lives. There have appeared many thoughtful obituaries since. With some delay we present a collection of papers that also show the important role of John Watkins within post-war philosophy of science.

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