

The Case of Evgenii Sergeevich Lyapin

Christopher Hollings* MIMA

A matter of great concern within the pages of recent issues of *Mathematics Today* has been the short-sightedness of policy-makers in the drive towards mathematics of immediate applicability. This article was inspired by these concerns and gives a very brief account of another instance of such lack of foresight at high levels: Soviet ideological interference in mathematics. I will make a few comments on such interference¹ and then illustrate it with the specific example of the 1949 ideological attack on the Russian algebraist E. S. Lyapin.

From the early days of the USSR, mathematics posed a problem for Marxist thinkers for two main reasons: (1) the ‘Marxist classics’ (i.e., the works of Marx, Engels and Lenin) provided little guidance as to how mathematics as a whole should be integrated into Marxist theory, and (2) the Soviet Marxist thinkers of the 1920s had little understanding of such new mathematical developments as set theory, for instance, and were therefore ill-equipped to begin to place such mathematics within their philosophical scheme. The result was a highly fragmented approach to mathematics amongst Marxist writers. One thing they did all agree on, however, was the fact that ‘idealistic’ tendencies in mathematics, such as abstraction and formalism, should be roundly condemned and stamped out: all mathematics should have, and should be seen to have, an origin in the real world; the only valid mathematics was that which served the needs of both science and society. The disunity amongst Marxist thinkers, however, meant that little headway was made in imposing this view upon mathematicians: most mathematicians (quite wisely) steered clear of philosophical issues and thus enjoyed a high degree of autonomy, free of the ideological interference that was starting to penetrate into other fields.

The beginning of the Stalinist period saw a crack down on all independent thought. Mathematicians were harshly criticised for not having done more to integrate mathematics into Marxist philosophy. Ideological attacks on individuals increased in frequency, as Stalin tried to break the independence of the intelligentsia (see, for example, [1, 2]). And yet the ideologues still made little headway with the Marxist interpretation of mathematics: their understanding of mathematics and its history remained inadequate, so they confined themselves to the continued criticism of instances of perceived idealism in mathematics (particularly in Western mathematics), but made no effort to suggest acceptable alternatives. A patriotic pride in the international standing of Soviet mathematics also helped to protect the discipline from the interference of overzealous ideologues.

In contrast to the mathematical difficulties still being experienced by Marxist philosophers, Soviet mathematicians developed a pragmatic defence strategy during the Stalinist period: they began to pay lip service to state ideology. This, however, consisted largely of vague, positive comments about Marxist philosophy of mathematics, with any specifics conveniently avoided. Although this approach was often criticised by philosophers, it proved very effective in deflecting ideological attacks which might otherwise have come. A particularly daring ploy by Soviet mathematicians was their use of Marxist ideas to justify the study of abstract mathematics: they claimed that, rather than being further removed from real-

world applications, the more abstract a mathematical idea became, the more applications could be dealt with under a single theory. On the whole, this strategy seems to have been successful – though not always, as we will see below.



Stalin’s death in 1953 marked the beginning of a (slightly) more liberal phase of Soviet history, the effects of which were certainly felt in the mathematical community. Mathematicians became bolder in their promotion of the above justification of abstract mathematics. They paid less and less lip service to state ideology and even went so far as to demote considerations of practical reality to a secondary position. It became possible for mathematics to be developed according

to its own internal logic, rather than merely in response to the often nebulous ‘needs of science and society’.

By the 1960s, it was recognised by Soviet thinkers that Marxist philosophy must be adapted to the needs of modern mathematics, rather than the other way around, which had been the prevailing official view in the preceding decades. A more balanced approach was taken to Western mathematics: certain aspects of it were still condemned as being idealistic, but it was now felt that some reconciliation between the Soviet and Western philosophies of mathematics might be possible. Marxist thinkers were now prepared to adopt the most acceptable aspects of Western thought into their own philosophy. The old guard of Marxist philosophers continued to object to these new developments, but with little effect. The liberal attitude in Soviet mathematics (and in science more generally) prevailed, although a similar liberalism in Soviet society at large would not emerge until the 1980s.

We now turn to the specific case of Evgenii Sergeevich Lyapin (1914–2005), Leningrad algebraist and, in particular, pioneer of semigroup theory. There are several biographical articles on Lyapin; in constructing this article, I have drawn heavily upon that of Khait [3], which is the only one to deal in any detail with the ideological attack upon Lyapin in 1949.

Lyapin studied mathematics at Leningrad State University (hereafter, ‘LSU’), and, upon graduation in 1936, immediately embarked upon a career in research; he successfully defended a dissertation on decompositions of Abelian groups in 1939, and then took up a teaching position at LSU. Life changed dramatically, however, with the USSR’s entry into the Second World War in June 1941. Weak lungs meant that Lyapin was not conscripted into the Red Army, and so, at least to begin with, he continued to teach mathematics.

* The Queen’s College, Oxford, OX1 4AW

By September 1941, the German army had failed in its objective to capture Leningrad, but it had succeeded in cutting off all land connections with the rest of the USSR. So began the Siege of Leningrad, which would last until January 1944. The days of the siege saw the residents of Leningrad suffer appalling hardship, with widespread starvation. Conditions were mitigated very slightly in the winter months with the opening up of the ‘road of life’, an ice road across the nearby Lake Ladoga, over which supplies were brought into the city. Amongst the large number of books on the Siege of Leningrad, there is, in particular, an oral history [4] which contains several contributions from Lyapin on life under the siege.

After several months of siege, both LSU and the Mathematical Institute of the Academy of Sciences were forced to close down, and so Lyapin’s teaching abilities were no longer required. He went to work instead, at least briefly, at the city’s architectural planning department, where he was involved in such matters as the provision of air raid shelters. Come the Summer of 1942, however, Lyapin was able to put his mathematical skills to use at Leningrad’s Principal Geophysical Observatory, where meteorological research was being undertaken. The various published biographies of Lyapin give passing hints as to what kind of work he did there, for example, ‘improving meteorological services for the Red Army’ [5, p. 175], ‘research ... on questions of atmospheric turbulence’ [6, p. 139] and, perhaps most intriguingly, ‘the calculation of the strength of the ice road on Lake Ladoga’ [3, p. 15]. Indeed, Lyapin seems to have been very heavily involved with the ‘road of life’. In their biography of Lyapin, two of his students, V. A. Makaridina and E. M. Mogilyanskaya, note, with evident pride in their former teacher, that Lyapin ‘contributed to the saving of hundreds of thousands of lives from starvation’ [7, p. 144]. However, it is rather difficult to pursue this matter further: the official documents relating to the wartime work of the Principal Geophysical Observatory remain secret.

With the end of the war, Lyapin was able to return to research in pure mathematics. Around 1939, his research interests had begun to turn from group theory to the burgeoning theory of semigroups, and he published his first paper in this area in 1947. Unfortunately, as noted above, Soviet science was passing through a difficult phase at this time, with ideological attacks on both science and scientists, the most infamous being the Lysenko affair in genetics. In 1949, the ideologues at LSU singled out what they deemed to be three particularly objectionable areas of pure mathematics, together with their main practitioners: topology, as studied by N. A. Shanin, functional analysis (B. Z. Vulikh) and semigroup theory (Lyapin). As abstract, formalised areas of mathematics, each of these three disciplines was quite new, and this is perhaps why they were regarded with suspicion.

A special meeting of the algebra section of the mathematics faculty was convened, and sat before an audience of teachers and students. The purpose of the meeting was ‘to expose ideologically alien and invalid effects’ [3, p. 16] in the development of mathematics: those areas were attacked which were deemed to be too abstract, too far separated from the material world, and therefore open to accusations of idealism. Indeed, Vulikh, Shanin and Lyapin were accused of conducting mathematics which was ‘divorced from life and not bringing any benefit to socialist society’ [3, p. 16].

The mathematician, physicist and loyal communist A. D. Aleksandrov advised Lyapin that his best course would be to keep quiet during the meeting – the outcome was a forgone conclusion, so why make matters worse by attempting a defence? However, whilst Vulikh and Shanin chose to heed similar advice, Lyapin took the op-

portunity to speak when it was offered to him. According to Khait, Lyapin ‘very emotionally objected to those who interfere with the advancement of science’, before going on to say that ‘the success of science demands the promotion of new ideas, we must give them the opportunity to develop’ [3, p. 16]. Lyapin apparently left the podium to applause, mostly from the students in the gallery.

Khait tells us that Lyapin’s speech was followed by one from the uniformed figure of R. E. Soloveichik, which provided a defence for Lyapin, though not of semigroup theory, or of abstract mathematics more generally. Soloveichik’s background was in mathematics: he too was a graduate of the mathematics faculty of LSU. Soloveichik and Lyapin had worked together during the war at the Geophysical Observatory. Soloveichik began with a general condemnation of those scientists who sought only ‘formal objectives’, ‘far from the needs of the national economy’ [3, p. 16]. He contrasted such people with those who had engaged in abstract work before the war, but had immediately turned, in the hour of the nation’s need, to the solution of problems for the armed forces. By this point in the speech, Soloveichik had apparently won over the presiding academics. He therefore felt confident enough finally to indicate that Lyapin was in fact a scientist of the latter type. He seems to have mentioned Lyapin’s involvement in the establishment of the ‘road of life’ – something which would no doubt have struck a chord with the Leningraders present, the siege being less than a decade in the past. Having illustrated Lyapin’s usefulness to the state, Soloveichik concluded by toeing the ideological line: ‘mathematics serves industrial purposes!’ [3, p. 16]. We are told that he too left the podium to applause.

With the fruitless attempts at defence concluded, the members of the presiding academic council engaged in a diatribe against formalism, idealism, cosmopolitanism, and, as Khait puts it, ‘other “isms”’ [3, p. 16]. At the close of the meeting, Lyapin’s fate was handed down: he was to be dismissed from the university. Perhaps owing to their silence, Shanin and Vulikh kept their jobs, probably suitably chastened. If we look at Shanin’s list of publications, we see that his work was divided into two phases: topology until 1949, logic and set theory thereafter. Vulikh’s work, on the other hand, shows no similar break: he continued to work in functional analysis even after 1949. Moreover, Lyapin also continued to work in semigroup theory. Indeed, his career continued almost without interruption: the leadership of Leningrad State Pedagogical Institute ‘pretended not to know what had happened at the university’ [3, p. 17], and so offered Lyapin a job. He remained at the Pedagogical Institute for the rest of his life.

Thus, it seems that the 1949 ideological issues at LSU had little impact on Soviet mathematics: all three ‘ideologically dubious’ areas continued to be studied in the USSR, and with great success. Indeed, it would appear that, on the whole, Soviet ideology had rather more impact on *mathematicians* than on *mathematics* itself. Certainly, Soviet mathematics never had its Lysenko. We can only hope that current trends prove to be as ineffective! □

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Notes

1. For a more detailed account of Soviet ideology and mathematics, see [8–10].

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