

The acceptance of abstract algebra in the USSR, as viewed through periodic surveys of the progress of Soviet mathematical science [☆]

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Available online 18 November 2014

Abstract

During the several decades of the USSR's existence, Soviet mathematicians produced, at intervals, a number of volumes of survey articles which provide us with a series of 'snapshots' of Soviet mathematics down the years. In this paper, I introduce these volumes as a resource for historians of Soviet mathematics, and consider the picture they paint of the development of abstract algebra in the USSR, paying particular attention to the aspects in which these surveys differ from later, retrospective accounts of Soviet algebra.

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Резюме

В течение нескольких десятилетий существования СССР советские математики с определенными интервалами выпустили несколько томов обзоров, которые дали целую серию "мгновенных снимков" советской математики за прошедшие годы. Настоящая статья имеет целью введение этих изданий в научный оборот в качестве источников по истории советской математики. В ней также исследуется создаваемая ими картина развития абстрактной алгебры в СССР. Особое внимание обращается на отличия этих обзоров от последующих ретроспективных отчетов о советской алгебре.

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MSC: 01A60; 08-03

Keywords: Soviet mathematics; Abstract algebra; Documentation of mathematics

[☆] This article was begun at the Oxford Mathematical Institute under the auspices of research project grant F/08 772/F from the Leverhulme Trust.

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1. Introduction

In 1962, an anonymous Western author penned a general appraisal of Soviet mathematics for a volume entitled *Recent Soviet contributions to mathematics* (LaSalle and Lefschetz, 1962). The author of this short article considered that

[a]lgebra is a strong point in Soviet mathematics, and they make a steady and relentless push towards a deeper understanding of it.

[Anon, 1962, p. 5]

A further contribution to the same volume (Good, 1962) focused specifically upon recent advances in Soviet algebra. In this latter article, we find a great range of Soviet algebra surveyed, covering an array of topics within the wider theories of groups, semigroups, algebras, rings and fields. All areas of ‘modern algebra’ appear to be represented. Indeed, Soviet algebra occupied a world-leading position at this time, thanks to the work of such famous mathematicians as P.S. Aleksandrov (1896–1982), B.N. Delone (1890–1980), D.K. Faddeev (1907–1989), A.N. Kolmogorov (1903–1987) and A.G. Kurosh (1908–1971), amongst many others.¹

As is well documented (see, for example, Corry, 1996), the field of study to which mathematicians applied the name ‘algebra’ underwent a gradual change over the course of the nineteenth and early twentieth centuries. In place of the traditional ‘algebra’ that had concerned itself largely with the solution of polynomial equations, and which may be said to have reached a comprehensive state in the work of Évariste Galois (1811–1832), there emerged the discipline of ‘modern algebra’: a much more abstract and ‘structural’ subject, based around such notions as groups, rings, integral domains, and fields, etc. In its latter, definitive stages, this transformation was driven to a large extent by the work of Emmy Noether (1882–1935) and her school.

As with any such sea change, this new conception of algebra was not adopted in all places at once, and only gradually became the dominant algebraic point of view. Given the later pre-eminence of Soviet algebraists, which, as the above quotation demonstrates, was acknowledged even in the West, this raises the question of the rate at which the new view of algebra was taken up in the USSR.

One of the earliest Russian accounts of the progress of the changing notion of algebra appears in B.V. Gnedenko’s 1946 *Essays on the history of mathematics in Russia* (*Очерки по истории математики в России*), where we find the following general statements:

Already at the start of the twenties O.Yu. Schmidt, a student of [the Kiev-based mathematician] D.A. Grave, began to cultivate in Moscow work in the domain of the theory of groups. Gradually, the algebraic interests of the participants of the seminar organised by Schmidt grew and encompassed more and more widely all branches of modern algebra. A considerable role in the familiarisation of Moscow mathematicians with the ideas of modern algebra was played by a visit to Moscow in 1928/1929 by one of the creators of modern abstract algebra, the professor of Göttingen University, Emmy Noether (1882–1935). As a result, there now operates in Moscow a very strong and many-membered algebraic school, led by O.Yu. Schmidt, and incorporating within it such major mathematicians as A.G. Kurosh [1908–1971], A.I. Maltsev [1909–1967], and others. The ideas of modern algebra have penetrated deeply into other areas of mathematics — topology (P.S. Aleksandrov, L.S. Pontryagin), functional analysis (I.M. Gelfand) and mathematical analysis proper (I.G. Petrovskii).²

¹ For an assessment of the place of Soviet contributions within twentieth-century mathematics more generally, see Dalmedico (1997, pp. 661–663).

² “В начале же двадцатых годов О. Ю. Шмидт, ученик Д. А. Граве, начал культивировать в Москве работу в области теории групп. Постепенно алгебраические интересы участников организованного

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