

Éléments de mathématique, by N. Bourbaki, Book II, *Algebra*, Chaps. I–VII, Actualités Scientifiques et Industrielles, nos. 934, 1032, 1044, 1102, 1179, Hermann, Paris, 1942, 1947, 1948, 1950, 1952

Our time is witnessing the creation of a monumental work: an exposition of the whole of present day mathematics. Moreover this exposition is done in such a way that the common bond between the various branches of mathematics becomes clearly visible, that the framework which supports the whole structure is not apt to become obsolete in a very short time, and that it can easily absorb new ideas. Bourbaki achieves this aim by trying to present each concept in the greatest possible generality and abstraction. The terminology and notations are carefully planned and are being accepted by an increasing number of mathematicians. Upon completion of the work a standard encyclopedia will be at our disposal. The volume on *Topologie générale* which is complete is already being used enthusiastically, especially by the younger generation. A comparison with the “Encyclopädie der mathematischen Wissenschaften” should not be made. The aim was different; proofs were omitted and each article was written by a different author.

I hope that this work will continue in the same spirit and with the same vigor. I would suggest an English translation.

The volumes on algebra that have appeared show the same general features as the rest of Bourbaki. Numerous exercises, many of them of highest interest, are found at the end of each paragraph. From time to time excellent historical notes explain the development of the ideas. It is inevitable that much of the material is of standard nature. In the following more detailed discussion I intend to underline mainly the novel ideas that appear in the work.

A few general remarks must precede this discussion. We all believe that mathematics is an art. The author of a book, the lecturer in a classroom tries to convey the structural beauty of mathematics to his readers, to his listeners. In this attempt he must always fail. Mathematics is logical to be sure; each conclusion is drawn from previously derived statements. Yet the whole of it, the real piece of art, is not linear; worse than that its perception should be instantaneous. We all have experienced on some rare occasions the feeling of elation in realizing that we have enabled our listeners to see at a moment’s glance the whole architecture and all its ramifications. How can this be achieved? Clinging stubbornly to the logical sequence inhibits the visualization of the whole, and yet this logical structure must predominate or chaos would result. Bourbaki is quite aware of this dilemma. The fact that his work is subdivided into books, the fact that exercises are given which utilize more advanced parts of the theory show this awareness. However I feel that in some instances the subdivision into books is not enough. This inadequacy is strongly felt in the course of Chapter V as we shall see later.

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In concluding I wish again to emphasize the complete success of the work. The presentation is abstract, mercilessly abstract. But the reader who can overcome

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the initial difficulties will be richly rewarded for his efforts by deeper insights and fuller understanding.

E. ARTIN