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Moderne algebra, by B. L. van der Waerden, Unter Benutzung von Vorlesungen von E. Artin und E. Noether, Springer, Berlin, 1931, Vol. I, viii + 243 pp., Vol. II, vii + 216 pp.

It will immediately occur to every reader of van der Waerden's new book that modern algebra is a subject quite different from the classical algebra built up in its last golden era by Dedekind, Weber, Frobenius, and Kronecker. It is true that a closer study often reveals that the main difference lies in the form of presentation, but it is equally true that in many instances the problems of modern algebra are broader and of a different character.

The new school of abstract algebra has developed into one of the strongest branches of present day mathematics in Germany. Its fundamental principles are closely related to Hilbert's ideas of a formal foundation of mathematics, reducing all theories to an axiomatic basis consisting of relational properties of undefined elements. It is of course nothing new to build up a mathematical theory from its axioms; the main problem of abstract algebra is however the determination of *all* systems with a given operational basis, i.e. to find the structural properties of all such systems. It is interesting to observe to what a remarkable extent this has been possible. An immediate consequence is an intimate knowledge of the fundamental assumptions of each theory and theorem; but still more important is the abstract identification of many mathematical investigations, also outside of algebra proper, which makes abstract algebra a unifying principle sorely needed in these times of specialization.

One of the central papers in abstract algebra is the well known analysis by Steinitz of the structure of fields. It has been followed by a vast number of investigations on the structure of groups, rings, ideals, hypercomplex systems, etc., works associated with the names of Artin, Krull, E. Noether, and others. For hypercomplex systems the investigations of Wedderburn and Dickson are outstanding.

This new *Algebra* proposes to be a guide to these investigations, and in many ways it is more than that; van der Waerden has coordinated the various investigations and he has tried as far as possible to consider them from the most general point of view. His book therefore gives considerably more than a summary of the previous theory, and it will certainly keep a prominent place among the books on algebra for many years to come. It is not a text book in the ordinary sense; and it requires a wide preliminary knowledge on the part of the reader, even though every subject is worked up from its foundations. But I am certain that advanced students and mathematicians interested in algebra will study it with great pleasure.

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