THE INFLUENCE OF J. H. M. WEDDERBURN ON THE DEVELOPMENT OF MODERN ALGEBRA

It is obvious that the title of this paper is presumptuous. Nobody can give in a short article a really exhaustive account of the influence of Wedderburn on the development of modern algebra. It is too big an undertaking and would require years of preparation. In order to present at least a modest account of this influence it is necessary to restrict oneself rather severely. To this effect we shall discuss only the two most celebrated articles of Wedderburn and try to see them in the light of the subsequent development of algebra. But even this would be too great a task. If we would have to mention all the consequences and applications of his theorems we could easily fill a whole volume. Consequently we shall discuss only the attempts the mathematicians made to come to a gradual understanding of the *meaning* of his theorems and be satisfied just to mention a few applications.

For the understanding of the significance that Wedderburn's paper *On hypercomplex numbers* (Proc. London Math. Soc. (2) vol. 6, p. 77) had for the development of modern algebra, it is imperative to look at the ideas his predecessors had on the subject.

The most striking fact is the difference in attitude between American and European authors. From the very beginning the abstract point of view is dominant in American publications whereas for European mathematicians a system of hypercomplex numbers was by nature an extension of either the real or the complex field. While the Europeans obtained very advanced results in the classification of their special cases with methods that were not well adapted to generalization, the Americans achieved an abstract formulation of the problem, developed a very suitable terminology, and discovered the germs of the modern methods.

On the American side one has first of all to consider the very early paper by B. Peirce, *Linear associative algebras* (1870, published in Amer. J. Math. vol. 4 after his death). In it he states explicitly that mathematics should be an *abstract* logical scheme, the absence of a special interpretation of its symbols making it more useful in that the same logical scheme will in general reflect many diverse physical situations. Although it is true that he was actually able to introduce and treat only the general linear associative algebra over the complex field, yet he clearly had in mind much more, and it is his attitude which leads to the modern postulational method. In his treatment of algebras he gives a rational proof of the existence of an idempotent