

SYLVESTER'S MATHEMATICAL PAPERS.

The Collected Mathematical Papers of James Joseph Sylvester.
(Edited by H. F. BAKER.) Volume I, xii + 650 pp.
Volume II, xvi + 731 pp. Cambridge, University Press,
1904, 1908.

PRIOR to 1877 there had been made in this country a few mathematical investigations of permanent value, in particular that by Benjamin Peirce on linear associative algebras. But such investigations had been done in isolation, and independently, in a measure, of contemporary European activity. These early writers were prophets, as it were, preparing the way for an era of wide-spread activity and interest in mathematical research. Chief among the forces which inaugurated this era was the advent of Sylvester at the opening of John Hopkins University in 1877, and his founding of the *American Journal of Mathematics* the following year. His high ideals for the search after truth, and his unbounded enthusiasm for mathematical science not only proved a powerful stimulus for his colleagues and students, but reached out beyond his immediate surroundings to the country at large.

Sylvester's work in this period, however, does not belong properly to the present review, since the first two volumes of his papers relate to the years 1837-1873. There occur 178 titles, including a few reports or abstracts of communications to societies. These latter titles appear to have been omitted from the Royal Society index, which shows 150 titles down to the year 1873. To judge from the later titles, including eighty-one for the next decade, there will probably be two additional volumes.

Sylvester's investigations related chiefly to algebra, including in that term the theory of invariants, matrices, theory of equations, etc., and the related domains of number theory, differential invariants, etc. However, there are various papers on astronomy, mechanics and physics, while a later volume will include his paper, "An application of the new atomic theory to the graphical representation of the invariants and covariants of binary quantics." His earliest paper related to Fresnel's optical theory of crystals; the next two and a paper of 1850 relate to motion and rest of fluids and rigid bodies. In