

*Opere matematiche di* FRANCESCO BRIOSCHI. Pubblicate per cura del comitato per le onoranze a Francesco Brioschi (G. Ascoli, E. Beltrami, G. Colombo, L. Cremona, G. Negri, G. Schiaparelli). Volumes 1, 2, 3. Milan, U. Hoepli, 1901, 1902, 1904. xi + 416, viii + 456, x + 435 pp.

BRIOSCHI's life covered seventy-three years (1824–97), the last fifty filled with mathematical labor as teacher, writer, and editor. Taking his doctorate at Pavia in 1845, he became professor of applied mathematics in that university in 1852, and in 1862 was commissioned by the government to found and organize the Istituto tecnico superiore at Milan. There he filled until his death the chairs of hydraulics and analysis, and the office of director. Together with Tortolini he founded in 1858 the *Annali di matematica pura ed applicata* (the immediate successor of the eight volumes of *Annali di scienze matematiche e fisiche*), and carried on independently the enterprise, so significant for the revival of mathematics in Italy, in a second series of twenty-six volumes, 1868–1897. Of his pupils at Pavia the most notable are Cremona, Beltrami, and Casorati. For an account of his labors for the Italian government and a careful analysis of his writings, one should read the excellent biography by Noether in the *Mathematische Annalen*, volume 50 (1898).

The present publication is a part (and the principal part we should esteem it) of the plan to provide a worthy memorial for this great scholar and educator. Scattered in five or more journals, the memoirs embodying Brioschi's extraordinary activity as commentator, critic and creator of modern mathematics had produced their first effect, that on his contemporaries. Now, collected, they become part of the accessible treasure of the scientist and historian. The plan is apparently to collect not his well-known books on determinants and mechanics of rigid systems, but only the shorter papers, from journals and the proceedings of learned societies.

So far there are republished 144 titles. Of these a rough enumeration shows 57 on algebraic invariants, 14 on modern geometry, 14 on differential geometry and the calculus of variations, 19 on differential equations, 21 on the theory of functions and higher analysis, 7 on history, bibliography and biography, 10 on physics or mechanics, and 2 miscellaneous. A more extended résumé is not our purpose here, in view of Noether's paper cited above. This collection reminds one of Cayley's works in

its magnitude, but of Clifford's in its large number of brief, pointed papers on topics of general mathematical interest.

The arrangement is by sets, the articles from any one serial appearing together in chronological order. The monograph on the theory of invariants of binary forms is at the close of volume 1, those on the solution of the quintic and sextic are scattered through all of these volumes. Each has a table of contents and a well-executed index. Volume 1 contains the well-known portrait, and the concluding (fifth) volume is to furnish a classified index and a compendious life.

H. S. WHITE.

*Verhandlungen des dritten internationalen Mathematiker-Kongresses in Heidelberg vom 8 bis 13 August, 1904.* Herausgegeben von dem Schriftführer des Kongresses, DR. A. KRAZER. Leipzig, Teubner, 1905. Royal 8vo, x + 755 pages.

A CONGRESS that can attract four hundred members and hold them for a week, half of them coming from countries outside Germany, must show in its proceedings something worth the study of philosophers, still more that demands the attention of progressive mathematicians. Numbers count for little, but the names of the participants prove the representative and international character of this great gathering. It is gratifying to see Russia occupying second place in number of delegates, and our own country contesting with Denmark the fifth place.

The secretary's report contains the address of Professor Weber, of Strassburg, in opening the Congress, which, it will be remembered, was designed in part as a commemoration of the centenary of the birth of C. G. J. Jacobi. Then follows the address of Professor Königsberger on Jacobi's life and work — dignified, scholarly, full of particulars, but free from technicalities, in short the finished production of the one man who was qualified by his biographical studies and oratorical ability for this onerous task. Next come the four lectures delivered in the general sessions, and these will doubtless prove, for most readers, the most profitable part of this voluminous record. Their titles are as follows: P. Painlevé, "The modern problem of integration of differential equations"; A. G. Greenhill, "The mathematical theory of the top, considered historically"; C. Segre, "The geometry of the present day and its