

If we were to pass a final judgment upon the book before us it would be this: It is in some respects an improvement upon its predecessors; it is by no means the best book that the present author could have written.

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CAMBRIDGE, MASS.,
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MINKOWSKI'S WORKS.

Gesammelte Abhandlungen von Hermann Minkowski. Herausgegeben von D. HILBERT. Leipzig, B. G. Teubner, 1911. Band 1, xxxi + 371 pp. Band 2, iv + 465 pp. Two portraits.

MINKOWSKI'S work divides itself naturally, and his collected works are divided, into four parts: Theory of quadratic forms, 242 pages, Geometry of numbers, 230 pages, Geometry, 180 pages, Physics, 163 pages. In addition to this the volumes before us contain the author's address on Dirichlet, 15 pages, and Hilbert's commemorative address on Minkowski, 27 pages. This heartfelt and touching tribute of a life-long friend and fellow-worker is in reality also a critical review of Minkowski's great achievements in mathematical science, and it may be that the best thing for us to do in reviewing these volumes would be to follow the example of the reviewer in another Bulletin* and translate the chief portions of that address. The availability of the address in the original, where it should be read as a whole, and, in abstracts, in French makes repetition here seem really unnecessary.

We are accustomed to precocious exhibitions of genius in mathematicians, and we often cite the case of Galois, who died in his twenty-first year after accomplishing work of which the fundamental importance was not and perhaps could not be appreciated until a much later date. Minkowski in his eighteenth year submitted to the Paris Academy a memoir on quadratic forms with integral coefficients which fills 142 pages of his collected works and which received the Grand Prix des Sciences mathématiques. Measured in pages, one-sixth of Minkowski's work was written before he was 18. His work of the next ten years deals almost exclusively with quadratic forms.

* *Bull. Sci. Math.*, France, vol. 36 (1912), p. 73.