

## THE ENGLISH AND FRENCH TRANSLATIONS OF HILBERT'S GRUNDLAGEN DER GEOMETRIE.

1. *Les Principes fondamentaux de la Géométrie.* Par D. HILBERT. Traduit par L. LAUGEL. Paris, Gauthier-Villars, 1900. 4to. 111 pp.
2. *The Foundations of Geometry.* By DAVID HILBERT. Translated by E. J. TOWNSEND. Chicago, The Open Court Publishing Company, 1902. 8vo. 132 pp.

It is indeed a matter for congratulation that Professor Hilbert's masterly discussion of the foundations of geometry has become so well known and so widely circulated. This circumstance is undoubtedly due to its clearness and force; for, while some of the previous studies along similar lines are difficult even for the advanced student to understand, Hilbert's style is so deceivingly clear as to lead certain minds to predict the use of this book in elementary instruction.

An excellent review of the original,\* rendered into English by Professor Ziwet, was given in the *BULLETIN* (volume 6, 1900, pages 287–299) by Dr. Sommer, of Göttingen; the present review will therefore not deal with the German edition, except for purposes of comparison.

If a minute criticism of the language of the French translation were the main purpose, the reviewer would certainly feel great hesitation in undertaking the task. But there are certain additions to the French translation which are most noteworthy, and with these we shall occupy ourselves chiefly.

On page 291 of his review, mentioned above, Dr. Sommer explains that Hilbert's axiom V is not sufficient to furnish a satisfactory foundation for the complete discussion of "the continuity of the straight line in the ordinary sense." This lack is supplied in the French edition by an additional axiom (by Hilbert) entitled "Axiome d'intégrité" (Vollständigkeitsaxiom), which practically requires that the system already set up shall

---

\* In this connection, a review of Hilbert's *Grundlagen der Geometrie* by H. Poincaré, *Bull. des Sciences Math.* (2), vol. 26 (Sept., 1902), p. 249, should be mentioned. This review is, as would be expected, of the greatest importance. The present writer regrets that his review was in type before that of Poincaré was seen. Footnotes have been added occasionally at points where this review would have been most influenced by Poincaré's.