The use of the factor of safety in designing is emphasized throughout.

The purpose of the author evidently is to make the problems as practical as possible; this he might have realized more fully if, for instance in the design of columns, he had given specific illustrations of such shapes actually designed and erected. Again, while the figures throughout the book are excellent and make their point, they would have been more efficient if, for example, in the case of riveted joints, they had represented actual sections, correct from the standpoint of engineering practice.

The typography of the book is up to the high standard of all of the texts of the Yale series. Tables of constants and data usually included in engineers' handbooks are given at the back.

ERNEST W. PONZER.

Das 200-jährige Jubiläum der Dampfmaschine, 1706–1906. Eine historisch-technisch-wirtschaftliche Betrachtung. Von KURT HERING, Ingenieur. Leipzig, Berlin, B. G. Teubner, 1907. Pp. 58.

THIS pamphlet is not put forth as a history of the steam-engine. Such a history could not very well be written within so small a compass. Prepared at the 200th anniversary of Denis Papin's invention, as set forth in his "Ars nova" (1707), the pamphlet devotes itself mainly to an exposition of the ideas and experiments of this noted French physicist, who for many years resided in Germany. Papin is looked upon by the author as the theoretical inventor ("geistige Erfinder") of the steam engine. It is unfortunate that an exact date (1706) is set up in the title of the publication for the invention. This date fixes Papin as the inventor, but such a claim the author does not really make in the body of the book. We translate from his introduction: ". . . but who was the inventor of this most important machine of modern times? Not as the work of one only, but as the product of many scholars and practical men of the most different nations, does the steam engine come down to us." One historical point, discussed by Hering, needs emphasis here, namely that Papin never constructed a steamboat and that the boat on which he travelled on the river Fulda from Kassel to Münden on September 24, 1707, though embodying the novel idea of paddle wheels, was not driven by steam. Since 1690 Papin had been con-

sidering the idea of applying steam power to boats, but in the description of a boat under construction, given in a letter to Leibniz (March 13, 1704), Papin says : "Je n'ay point préparé celui ci pour y emploier la force du feu : parceque ce n'est pas à moi d'entreprendre trop des choses à la fois." In Robert H. Thurston's History of the growth of the steam engine (New York, 1893), we read (pages 224, 225) that Papin propelled his boat by his "steam engine" and that "an account of his experiments is to be found in manuscript in the correspondence between Leibniz and Papin, preserved in the Royal Library at Hanover." As Thurston does not give the date of the letter, nor quote from it, while Hering supports his contention also by quoting E. Gerland, who for thirty years has been engaged in editing the correspondence between Leibniz, Papin, and Huygens and the Leibnizian manuscripts on mechanics, and who stoutly combats the conclusion that Papin ever built himself a boat driven by steam, it would seem that Thurston must be in error. Were there any real support to the story of Papin's steamboat, then surely the Germans would be the last to deny it.

The pamphlet closes with a chapter embodying statistics and charts to show the effect of the introduction of the steam engine upon industrial life, particularly in Germany.

<div align="right">FLORIAN CAJORI.</div>

NOTES.

AT the April meeting of the Council of the AMERICAN MATHEMATICAL SOCIETY, Professor E. B. VAN VLECK was re-elected a member of the Editorial Committee of the *Transactions*.

THE April number (volume 9, number 3) of the *Annals of Mathematics* contains the following papers : "A necessary condition that all the roots of an algebraic equation be real," by O. D. KELLOGG ; "The equilibrium of a heavy homogeneous chain in a uniformly rotating plane," by E. B. WILSON ; "The continuity of the roots of an algebraic equation," by J. L. COOLIDGE ; "On the differentiation of definite integrals," by W. F. OSGOOD ; "Note on the convergence of a sequence of functions of a certain type," by H. S. BUCHANAN and T. H. HILDEBRANDT ; "On the inverse problem of the calculus of