it is obvious that we have also

$$(\tau + 1)^{p^2} \equiv \tau^{p^2} + 1 \mod p^3.$$

But this congruence is implied by (7) alone, as one may readily verify by multiplying (7) by $\tau^{p^2}$. Other cases may be dealt with similarly.

INDIANA UNIVERSITY,
*November*, 1912.

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## INTEGRAL EQUATIONS.

*Introduction à la Théorie des Equations intégrales.* By T. LALESCO. Paris, A. Hermann et Fils, 1912. 152 pp.

*L'Equation de Fredholm et ses Applications à la Physique mathématique.* By H. B. HEYWOOD and M. FRECHET. Paris, A. Hermann et Fils, 1912. 165 pp.

THE theory of integral equations has been developed since the publication of Volterra's first paper in 1896, and most of the work has been done since Fredholm's fundamental memoir appeared in 1900. Yet, in this comparatively short time, the number of printed papers dealing with the subject has become so great that one approaching the subject for the first time is embarrassed by the wealth of material at his command. The two books mentioned above have been written for the beginner in the study of this interesting and useful branch of analysis. The authors have given a clear and concise exposition of the fundamental principles and of the most important results obtained up to the present time. While admitting freely that there is much yet to be done both on the theoretical side and the side of applications to mathematical physics and mechanics, there can be no doubt that the fundamental portions have already reached a form that will remain classic, and that it is now desirable to have them in book form for the convenience of the mathematical public. These two small volumes will be found very useful to the reader who wishes merely an acquaintance with the first principles of the subject, as well as to the reader who expects to attain a wider knowledge by studying the journal articles. While there is necessarily some repetition the two books may well be used together. The first one is devoted to the theory of integral equations and