Notions de Mathématiques. Par A. SAINTE-LAGUË. Avec
　Préface de G. KOENIGS. Paris, A. Hermann et Fils, 1913.
　vii + 512 pp.　Price 7 francs.

In France, during the past decade, the baccalauréat de
l'enseignement secondaire has been granted to students who
have successfully completed the seven year course of the
lycée, in one of four main lines of study. In the seventh year
these classes of students are characterized as of Philosophie
A, Philosophie *B*, Mathématiques *A*, or of Mathématiques *B*.
All students of the first two classes have studied both Latin
and Greek, in the third class Latin and modern languages but
no Greek; in the fourth class, no students have had Greek,
few have taken up Latin but all have had broad training in
modern languages. Prior to the seventh year those in the
Philosophie group have devoted 10.5 to 11 per cent. of all
their recitation periods to mathematics; those in the Mathé-
matiques group 19.4 to 22.8 per cent. From the latter group
come the future mathematicians.

It was with the needs of the students of the classes Phi-
losophie *A*, *B* in mind that M. Jules Tannery wrote his most
interesting Notions de Mathématiques* to which are appended
25 pages of Notions Historiques by his brother Paul. Although
Tannery's work is largely in conformity with the *programme,* the
whole reads as a freshly told story. About a third of the book
is devoted to an " Introduction." With particular insistence
on the accurate definition of all terms used, the following
subjects are treated in nine chapters: identities; algebraic
geometry; equations of the second degree; coordinates;
empirical curves; notions of analytical geometry (40 pages);
tangents, velocity derivatives; notions of the integral calculus;
limits; infinitesimals, definite integrals, series. The student
cannot fail to be interested by the way in which the various
subjects are welded into a homogeneous whole.

M. A. Sainte-Laguë, " professeur de mathématiques
spéciales " in the lycée at Besançon and an Ecole Normalian
of 1903, has followed in the steps of his former master by now
publishing a book with the same title as the one to which we
have just referred. But though it is much larger, the topics

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* A German edition has been published (1909) with the title Elemente
der Mathematik. Cf. the BULLETIN, April, 1911, vol. 17, pp. 367–368.
About 20 pages of "Notions d'Astronomie" are appended to the French
editions since 1905.

treated are fewer in number and the whole method of discussion is radically different. At most universities of France a course in mathématiques générales is offered for students of physics, chemistry and engineering. Algebra, analytical geometry, analysis, and mechanics are here developed.* Largely as a preparation for such courses and to fill up lacunæ in connection with them, M. Sainte-Laguë's book was written. While rigor of presentation is not neglected, details in proofs are not always dwelt upon and practical applications of the various subjects are emphasized.

To contrast with Tannery, the first section (pages 1–81) treats of arithmetic; the next section (pages 82–202) of algebra, including derivatives; plane trigonometry, pages 203–234; under geometry (pages 235–399) the sub-headings are: lines and planes, parallels, spherical geometry, metrical relations, lengths, areas and volumes ("formule de Tchebitcheff" is used on page 347 and page 502 but this spelling is not sanctioned by either Cantor or *Bibliotheca Mathematica*), graphic constructions, descriptive geometry, methods in geometry; kinematics, pages 399–416.

At the end of every section are references to 500 exercises for solution (pages 417–470). These are mostly numerical and letters A, B, C indicate the degree of their difficulty. Then follow various numerical tables including one of logarithms (four place), formulas, etc. The whole concludes with an admirable "index alphabétique" as well as "table des matières" (pages 503–512).

Anyone somewhat familiar with the French educational system will find this volume of interest. In connection with both the theory and the problems there is suggestive material for early undergraduate college teaching.

R. C. ARCHIBALD.

Encyklopädie der Elementar-Mathematik. Angewandte Elementar-Mathematik. Zweiter Teil. Dritter Band. Zweite Auflage. Von HEINRICH WEBER und JOSEF WELLSTEIN. Leipzig und Berlin, Teubner, 1912. xiv+671 pp. 14 Marks.

* A representative treatment of the subject is given in E. Fabry's Traité de Mathématiques générales, 2e éd., Paris, 1911, and the key to the problems, Problèmes et Exercices de Mathématiques générales, Paris, 1910. The first editions of these books have been reviewed in the BULLETIN, vol. 15 (1909), pp. 395–399 and vol. 17 (1911), p. 320.