carry through this proof the general solution of

$$y'' + \lambda A(x)y = f, \quad y(a) = y(b) = 0$$

is first derived. The minimum problem which is to be treated is to minimize $\int_a^b y'^2 dx$ under the condition that $\int_a^b Au^2 dx = 1$ and $\int_a^b y_i y dx = 0$ $(i = 1, 2, \cdots, n)$, where $y_1, \cdots, y_n$ are the solutions belonging to $\lambda_1, \cdots, \lambda_n$. This gives in order of increasing magnitude the positive values of λ; these exist in infinite number if ϕ is anywhere positive. Likewise a series of negative values of λ will be obtained if ϕ is anywhere negative.*

A formal expansion of an arbitrary function is then given by

$$f = \sum_{-\infty}^{+\infty} c_i y_i, \quad c_i = \pm \int_a^b f A_i y_i dx,$$

and Professor Mason states the theorem that this expansion holds if f vanishes at a and b, is continuous, and has a derivative continuous save at a finite number of points. The proof however contains an error.†

G. D. BIRKHOFF

SHORTER NOTICES.

Vorlesungen über Algebra. Von GUSTAV BAUER. Herausgegeben vom Mathematischen Verein München. 2te Auflage. Leipzig und Berlin, B. G. Teubner, 1910. vi + 366 pp.

THAT Professor Bauer's lectures, which were published in honor of his 80th birthday by the Mathematical Club of Munich in 1903, are destined to outlive their author by many years, seems to be evidenced by the fact that a second edition became necessary in 1910, seven years after the first edition and four years after Professor Bauer's death, which occurred on April 3, 1906.

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*See an article in the *Transactions*, vol. 8 (1907), p. 373.

† At bottom of p. 219 it is necessary to replace the multiplier 2 in the inequality

$$(\phi_{n,m})^2 \leqq 2 \sum_{i=n}^{m} c_i^2 \left(\int^x y_i' dx \right)^2$$

by a multiplier $m - n$. This error appears to destroy the force of the proof.