THE NEW RIEMANN-WEBER—VOLUME II

Die Differential- und Integralgleichungen der Mechanik und Physik.
Zweiter, physikalischer Teil, edited by P. Frank with the assistance of
H. Faxén, R. Fürth, Th. v. Kármán, Fr. Noether, C. W. Oseen, A.
Sommerfeld, E. Trefftz. Braunschweig, Vieweg, 1927. 863 pp.+88
figures. Paper, 53 Rentenmark; bound, 58 Rentenmark.

The first part, or mathematical section of this work, was reviewed by
the present writer in the May-June 1927 number of this Bulletin. It
outlines in a very broad manner the mathematical tool-box of the the-
oretical physicist of the present day, which covers nearly the whole realm
of analysis and large portions of the other departments of mathematics.

For the second volume, the goal adopted by the editors was to accom-
plish for the last Riemann-Weber volume of 1910, that which Weber did
in 1900, for Riemann's original *Partielle Differentialgleichungen der mathe-
matischen Physik.* We may quote freely from the preface to the effect
that in spite of fad and fancy in physical hypotheses, the mathematical
formulations and methods are relatively constant. Examples are cited in
the application of the planetary perturbation theory of Laplace and La-
grange to atomic states of energy; in the identity between the equations
for the transfer of heat due to Fourier and that of the phenomena of dif-
fusion in liquids; in the universality of the wave equations of D'Alembert,
Euler and Gauss in sound, light, and atomistics; in the appearance of
classical potential theory of Laplace, Gauss, Cauchy and Riemann in
the modern theories of lift and drag on an airplane wing. Contrarywise,
the fluid theories of heat and electricity are in the discard, atoms, molecules
and electrons may even follow, Newton's hypothesis of Universal Gravita-
tion may go out of fashion, but the fundamental analytic framework in
terms of which the corresponding phenomena are described is relatively
permanent. More recently, the influence of the mathematical frame of
reference on hypothesis has been considerable.

The second volume of the present work joins on to the first in very
much the same manner as superstructure to foundation. Despite the fact
that volume two is the work of seven writers, in each case different from
each of the eight collaborators on the first, a unified picture of the entire
field wherein differential and integral equations function in the field of
mathematical physics has been secured. There is no discussion of merit
or lack of merit of physical hypothesis, very little comparison between
mathematical result and experimental observation, but for the sake of
unity the entire purpose is concentrated on the development of those
particular analytic formulations in the realm of physical phenomena,
particularly to recent developments such as quanta, Brownian movements,
radiation, etc., together with technical applications of special importance
such as aeronautics and radio. Some of this material on these topics appears
in print for the first time.

The following is a summary by chapter headings: