Vorlesungen über Kreis- und Kugel-Functionen-Reihen. Von
DR. JOHANNES FRISCHAUF. Leipzig, B. G. Teubner,
1897, pp. 60.

THIS little treatise will be welcomed by students of pure
analysis and also by students of mathematical physics. The
subject treated has already an extensive literature of its
own ; but the important results in this field are scattered
through different memoirs of Dirichlet, Du Bois Reymond,
Bonnet, Lipschitz, Dini, and others, while there has appeared
no distinctly elementary treatment of the subject as a whole.
Thorough and comprehensive treatments of Fourier's series
and other allied developments have indeed been given by C.
Neumann in his " Uber die nach Kreis- Kugel- und Cylinder-
Functionen fortschreitenden Entwickelungen," and by Dini
in his "Serie di Fourier e altre rappresentazioni analitiche
delle funzioni di una variabile reale," but these treatments
could hardly be called elementary—certainly not in com-
parison with the above work. The author has followed a
uniform and easy method throughout and has shown the
convergence of Fourier's series, of Fourier's integral, and
of the developments in terms of zonal and spherical harmon-
ics in case the function to be developed has but a limited
number of maxima and minima within a certain interval
and is either continuous within this interval or else has but
a finite number of so called " finite discontinuities." Some
of the simpler cases are also considered in which the maxima
and minima become infinite in number in the neighborhood
of certain points, or in which the function at certain points
becomes infinite in value. In brief, the author has given us
an elementary, systematic treatment of these series for
all cases which might ordinarily arise in connection with
nature.

Chapter I. deals especially with Fourier's series. Chap-
ters II. and III. are devoted to the discussion of certain
general properties of zonal and spherical harmonics, and
Chapter IV. relates to the developments in terms of the lat-
ter functions. Illustrative examples are given throughout.

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