Book Review

Collected Papers of Sir Harold Jeffreys

Vol. I—Theoretical and Observational Seismology

(Gordon and Breach, London Paris New York 1971 xviii + 537 pp.)

This is the first of six proposed volumes of the collected papers of Sir Harold from 1915 onwards. The Geophysical Journal above all must give a warm welcome to the collection, for it was in its predecessor, the Geophysical Supplement to the Monthly Notices of the Royal Astronomical Society, that a large proportion of the papers first appeared; indeed at times it must have seemed that not only had Sir Harold founded the Geophysical Supplement but that he wrote much of it single handed.

With five more volumes still to appear, this is no time to try to assess the debt that geophysicists owe to Sir Harold. That must await the appearance of at least the next four volumes (Volume 6 is to be 'Miscellaneous', presumably not geophysical) and most of his observational studies in seismology will be in Volume 2. Some indication may however here be given of the way in which Sir Harold so often was the first to pick out the key problems. Here is a paper on plasticity and creep in solids from 1932, the first use of the notation $SH$ and $SV$ (1926), the first analyses of the seismic wave travelling along the boundary between two layers (1926), the first statement of the ellipticity correction in seismology (1935) together with other significant contributions to the theory of seismology.

Sir Harold's work on the analysis of seismic observations is of course his most substantial contribution to geophysics, and here we have only the first part, up to his first paper with Bullen, a long memoir on Times of Transmission of Earthquake Waves (1935), the beginning of the revision of the Zöppritz–Turner tables which led to the well-known Jeffreys–Bullen tables. Here are papers on near earthquakes and crustal structure from 1923 onwards, here also is the first paper (1926) to draw the explicit conclusion that the core of the Earth is fluid. Another paper of 1926 raises a problem to which there is still no satisfactory solution—how can the rate of generation of heat by radioactivity in the upper part of the continental crust be reconciled with the observed rate of flow of heat through the surface? Earlier, in a paper with Dr Dorothy Wrinch on the Oppau explosion, the suggestion had been made for the first time that the upper and lower layers of seismology corresponded to the acidic and basic layers of Suess and the term 'granitic layer' was introduced. In retrospect, the phase seems to have been unfortunate, for strictly speaking granite cannot make up a large proportion of even the upper part of the crust, but the general concept has been immensely fruitful.

One can only look forward with keen anticipation to the remaining volumes, certain to contain papers of fundamental importance which geophysicists and astronomers will be glad to have for reference, and also papers of great interest for the recent history (yet how long ago it must seem) of geophysics. Our gratitude goes out to Sir Harold for collecting and commenting on his papers and to the publishers for the attractive presentation.

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