The Quantum Theory of Radiation. By W. Heitler. Oxford, Clarendon Press, 1936. xi+252 pp.

This is the eleventh in The International Series of Monographs on Physics which is published under the editorship of R. H. Fowler and P. Kapitza and it may be fairly said to maintain the very high standard set by the preceding numbers of the series. The first chapter, about one-fifth of the book, is devoted to the classical theory of radiation (Maxwell's equations, electromagnetic potential, field of a moving electron, scattering and absorption of light) and ends with the Hamiltonian form of treatment which is based on the wave equation governing the vector potential and a consequent expansion of the vector potential in a Fourier series (after the time variable has been separated from the space variables). The second chapter treats the quantum theory of the field in free space (the field being regarded as the result of a superposition of plane waves and each of the plane waves having the same Hamiltonian as a linear oscillator). The third chapter discusses the interaction of radiation with matter (emission and absorption, breadth of spectrum lines, photo-electric effect, dispersion and Raman effect, resonance fluorescence, Compton effect). Chapter 4 is devoted to the positive electron and the book closes with a discussion of the penetrating power of high-energy radiation and a summary account of the Born-Infeld non-linear theory of the electromagnetic field.

It may well be imagined from the indication given above of the variety of topics treated that the reading of the book under review is not easy. The boldness of speculation and imagination which is so characteristic of the physical theories of the past decade is continually in evidence and a mathematician, who cannot ride with a carefree heart in the vanguard of attack but must have an ever present anxiety about his lines of communication, may have his moments of discouragement. For instance, the author introduces (p. 71) as a "relativistic analogue of Dirac's well-known δ function" the function

$$\Delta = \lim_{\kappa\to\infty} \frac{1}{\pi r}\left[\frac{\sin \kappa(r+ct)}{r+ct} - \frac{\sin \kappa(r-ct)}{r-ct}\right]$$

and an old-fashioned conscience is worried by a limit which does not exist. But the whole work carries the stamp of authority and one may surmise that these twinges of conscience are caused by nothing more important than matters of elegance which, in the words of Boltzmann, may safely be left to the tailor and the cobbler.

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Les Involutions Cycliques Appartenant à une Surface Algébrique. By Lucien Godeaux. (Actualités Scientifiques et Industrielles, No. 270.) Paris, Hermann, 1935. 44 pp.

The same scheme is used in the present pamphlet as in the preceding ones, namely, to present a brief and fairly popular account of the status of a problem, but accurate and including a suggestion for the direction of most probable further development. Proofs are not given, but the bibliography of fifty-eight titles is cited as occasion arises. This is fairly full, but a number of important recent contributions are not included.