stated bear, in a very important manner, upon the formation of the theory; and we must now proceed to consider what appears to have been done in this respect; taking into account, it must still be borne in mind, only the phenomena of conduction and radiation.

Sect. 7.—Fourier's Theory of Radiant Heat.

THE above laws of phenomena being established, it was natural that philosophers should seek to acquire some conception of the physical action by which they might account, both for these laws, and for the general fundamental facts of Thermotics; as, for instance, the fact that all bodies placed in an inclosed space assume, in time, the temperature of the inclosure. Fourier's explanation of this class of phenomena must be considered as happy and successful; for he has shown that the supposition to which we are led by the most simple and general of the facts, will explain, moreover, the less obvious laws. It is an obvious and general fact, that bodies which are included in the space tend to acquire the same temperature. And this identity of temperature of neighboring bodies requires an hypothesis, which, it is found, also accounts for Leslie's law of the sine, in radiation.

This hypothesis is, that the radiation takes place, not from the surface alone of the hot body, but from all particles situated within a certain small depth of the surface. It is easy to see[22] that, on this supposition, a ray emitted obliquely from an internal particle, will be less intense than one sent forth perpendicular to the surface, because the former will be intercepted in a greater degree, having a greater length of path within the body; and Fourier shows, that whatever be the law of this intercepting power, the result will be, that the radiative intensity is as the sine of the angle made by the ray with the surface.

But this law is, as I have said, likewise necessary, in order that neighboring bodies may tend to assume the same temperature: for instance, in order that a small particle placed within a spherical shell, should finally assume the temperature of the shell. If the law of the sines did not obtain, the final temperature of such a particle would depend upon its place in the inclosure;[23] and within a shell of ice we should have, at certain points, the temperature of boiling water and of melting iron.

This proposition may at first appear strange and unlikely; but it may

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[22] *Mem. Inst.* t. v. 1821, p. 204.

[23] *An. Chim.* iv. 1817, p. 129.