ledge of the mechanism of the ether on the one side, of ponderable matter on the other. Two ways are open by which a solution of this ultimate or fundamental problem can be solved. The one is purely mathematical. It means the analysis of all the possible modes of motion of a given mechanical system, and of the mutual influence which two interconnected mechanical systems, that of the ether and that of ponderable matter, exert on each other. This is a perfectly definite though a very intricate problem. It is a problem which can be compared with— though it transcends in complexity—the analytical problem suggested by the gravitational view of physical astronomy : to calculate mathematically the movements of any number of bodies attracting each other according to Newton's formula. The other way is the experimental method — to observe how under methodically altered conditions rays of light are modified in colour (wave-frequency), in direction, in intensity (amplitude of wave-motion), in laterality (polarisation), and in other ways ; and then to translate these conditions and alterations into the now fairly well-established language of the vibratory theory; gaining in this way indications as to the changes which the wave-motion is capable of, and inferring from these possible changes the original constitution (usually called the constants) of the primary substances—the ether and the ponderable matter which come into interaction.

It may in general be stated that neither of these two methods has for any length of time been pursued alone, but that progress has nearly always depended upon an alternating employment or a combination of both. On

28.
The problem of the ether may be treated mathematically,

29.
or experimentally.

30.
Necessity of combining the two methods.