

by its pull. But in so doing the same pull will also be communicated to the ball behind it, drawing it forward, and so in succession to those yet behind; and in this manner, a *wave of extension* will run back along the series. If the tension of the string be very violent (suppose equal to the repulsive elasticity of the balls), this wave will run back with *the same velocity* as the other. Here we have then a case of the reflexion of a wave, where, *in the very instant* of reflexion, its character is changed *ipso facto* from that of a wave of compression to one of extension—in other words, it starts backwards in *the opposite phase* to that of its arrival; or, again in other words, a *semi-undulation is lost or gained* (for it matters not which) *in the act of reflexion*.

(86.) This is the extreme case of reflexion from a denser medium on a rarer—for here there is absolutely nothing to carry on the motion beyond the terminal ball. Such a case never occurs in nature as regards light; since even what we call a vacuum is filled with the luminiferous ether. To assimilate it to such as *do* occur, suppose a second series of *smaller* balls, similarly connected with each other, *but not with the first set*, and brought end to end with it, with just room between for one intermediate free ball of the smaller size to play backwards and forwards as a go-between; and let this, in the first instance, be placed in contact with the last ball of the first set. When the movement reaches it, it will be driven off, and immediately striking the end ball of the second set, will propagate along *it* a wave of compression, coming itself to rest. In so doing it will carry