first to arrive will not be along the geometrically shortest line but along a line concave to the surface, the line along which the pulsations are most quickly transmitted. But even were we to omit the assumption of any particular law for the increase of density as we descend into the earth and treat the medium simply as isotropic we will be able to make the point that we have in view. We will take then that the particular wave travels along the chord, the shortest distance between the two points, *i.e.*, of origin and station, and this distance is accurately known, as is the time. We obtain then an incontrovertible average speed or velocity of propagation of the pulsations. Now let us return to the physical laboratory and see what information we can obtain there to enlighten our path and draw valid conclusions. We find that the speed of propagation through various substances is given, and further that the law of speed is expressed by $v = \sqrt{\frac{E}{d}}$, *i.e.*, the velocity of a wave of compression and dilatation or rarefaction in an isotropic medium is equal to the square root of the elasticity of the medium divided by its density,—or we may say that the velocity varies directly as the square root of the elasticity and inversely as the square root of the density. Increase of temperature also increases the velocity. It is generally accepted that the first preliminary tremors are longitudinal waves, while the second preliminary tremors are transverse, and the waves of the principal portion are surface waves.

When we compare various seismograms of the same quake, having noted on each the various phases, it will be found that the time interval from the occurrence of the shock to the arrival of the long-period waves is directly proportional to the arcual distance from the epicentre. Or inversely, we find for that particular kind of wave that the time interval is proportional only to the respective arcual distances from the centre of disturbance, and as the velocity is dependent upon the density of the medium, the medium, we see, must be more or less uniform, in this respect, which occurs only between two points when the path joining them lies along the surface of the earth. Hence this form of