

THE RIDDLE OF THE UNIVERSE

as pursuing their orbits in eternal regularity. Astrophysics owes much of its triumph to the immense progress of other branches of physics, of optics, and electricity, and especially of the theory of ether. And here, again, our supreme law of substance is found to be one of the most valuable achievements of modern science. We now know that it rules unconditionally in the most distant reaches of space, just as it does in our planetary system, in the most minute particle of the earth as well as in the smallest cell of our human frame. We are, moreover, justified in concluding, if we are not logically compelled to conclude, that the persistence of matter and force has held good throughout all time as it does to-day. Through all eternity the infinite universe has been, and is, subject to the law of substance.

From this great progress of astronomy and physics, which mutually elucidate and supplement each other, we draw a series of most important conclusions with regard to the constitution and evolution of the cosmos, and the persistence and transformation of substance. Let us put them briefly in the following theses:

I. The *extent* of the universe is infinite and unbounded; it is empty in no part, but everywhere filled with substance.

II. The *duration* of the world is equally infinite and unbounded; it has no beginning and no end: it is eternity.

III. Substance is everywhere and always in uninterrupted movement and transformation: nowhere is there perfect repose and rigidity; yet the infinite quantity of matter and of eternally changing force remains constant.

IV. This universal movement of substance in space