

THE MORNING GUARDIAN

THURSDAY JULY, 23, 1903.

THE UNIVERSE AND THE ATOM.

To the earlier world the conception of the universe was very like the first belief of the little child of today, that the flat earth is the centre of the entire system, that the sky, sun, moon and stars are but a little higher or farther away than the mountain tops. Astronomy and the telescope have revealed suns and solar systems of tremendous magnitude scattered through illimitable space, moving with resistless force and incredible speed, where to the untutored antediluvian or the little child there were but little twinkling points, stationary in a sky a few miles away. We have learned that in the course of the years we are on this planet are sweeping on at a speed of one thousand miles a minute to complete our annual journey of nearly six hundred millions of miles around the sun. We have learned that there are other bodies much larger than the earth which move with regular motion more rapidly than we, and others still, the comets, one of which is now visible in the northern sky, which move in elongated orbits with varied velocity, ever increasing toward almost incredible swiftness in approaching the sun, and with more and more retarded motion as they recede into the depths of space.

By so much has our conception of the universe, and with it our conception of the Creator, been enlarged. At the same time science has turned with almost equal interest from the vast to the small, from the study of the universe to the

study of the minutest component parts of what we call matter. John Dalton, scientist and philosopher a hundred years ago, evolved the atomic theory of matter. It was a good enough theory for chemists and scientists to work with and has served their purpose for a century past. Lord Kelvin gave us a popular idea of the size of atoms when he said that if a single drop of rain could be magnified to the size of the whole earth, we might reasonably expect to find the atoms which composed it would be somewhere between cricket balls and footballs in size. So vast would be the number of atoms in a single drop of water according to the conception of the scientific world for a century past and down almost to the present day. But the atomic theory no longer holds. The atom altogether far too small to be visible, is an atom no longer—not an indivisible unit, but is itself composed of many parts. Such is the conclusion of the chemistry of to-day, helped out by observations of that marvellous substance known as radium, and the further development of electrical science.

It is now, we are told, becoming exceedingly probable that the troublesome question, "What is electricity," will be answered by saying that it is matter, or that matter is electricity, or rather that the two concepts are but manifestations of the same root-stuff in different conditions. The new chemistry suggests that matter and electricity are the same; that what have been called atoms consist of far tinier bodies, the ions, or electrons, which are simply charges of electricity. Sir Oliver Lodge suggests that the typical atom may be similar to a starry system consisting of a definite number of these electrons moving in rapid orbits, just as the planets move around the sun, although no atom is so simple as our solar system. For the simplest atom, that of hydrogen, is believed to consist of about 700 electrons in regular orbital motion, under laws closely akin to those which keep the earth in its course around the sun. The electrons which compose all matter and all gases are supposed to be exactly alike, but a different number go to make up the atoms which compose different substances. For the atom of oxygen is made up of 16 times as many electrons as the atom of hydrogen, a gold atom 196 as many, and so on. But there is one law governing all, from the electron to the atom, from the atom to the planet, from the planet to the universe.

The question as to Pope Leo's successor in the papal chair is for the time an impenetrable one, beyond the large probability that he will be an Italian. The Catholic nations having each a veto power over prospective candidates complicates the situation somewhat, and no doubt militates against Cardinal Rampolla's chances of elevation. Marion Crawford, the author, who is also a Roman Catholic, and has given study to the question, apparently believes that Cardinal Gotti will be selected. This is merely the opinion of one, well-informed in many matters, but who cannot know the secret springs of action which will dominate the Conclave. Crawford's guess may turn out to be a happy hit, but it is a guess and little more. The world can only know who the next Pontiff will be when his name is officially announced.

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