

## THE RIDDLE OF THE UNIVERSE

tant embryonic feature is common to the entire animal world. The circumstance that in the sponges and the cnidaria (polyps, medusæ, etc.) the body consists for a long time, sometimes throughout life, merely of two simple layers of cells, seemed to me especially significant. Huxley had already (1849) compared these, in the case of the medusæ, with the two primary germinal layers of the vertebrates. On the ground of these observations and comparisons I then, in 1872, in my *Philosophy of the Calcispongiae*, published the "theory of the gastræa," of which the following are the essential points:

I. The whole animal world falls into two essentially different groups, the unicellular primitive animals (Protozoa) and the multicellular animals with complex tissues (Metazoa). The entire organism of the protozoon (the rhizopods of the infusoria) remains throughout life a single simple cell (or occasionally a loose colony of cells without the formation of tissue, a *coenobium*). The organism of the metazoon, on the contrary, is only unicellular at the commencement, and is subsequently built up of a number of cells which form tissues.

II. Hence the method of reproduction and development is very different in each of these great categories of animals. The protozoa usually multiply by *non-sexual* means, by fission, gemmation, or spores; they have no real ova and no sperm. The metazoa, on the contrary, are divided into male and female sexes, and generally propagate sexually, by means of true ova, which are fertilized by the male sperm.

III. Hence, further, true germinal layers, and the tissues which are formed from them, are found only in the metazoa; they are entirely wanting in the protozoa.