

conclusions is that of Boveri, who maintains that the ripe egg possesses all the organs and qualities necessary for division excepting the centrosomes, by which division is initiated. The spermatozoon, on the other hand, is provided with a centrosome, but lacks the substance in which this organ of division may exert its activity. Through the union of the two cells in fertilization all of the essential organs necessary for division are brought together; the egg now contains a centrosome which by its own division leads the way in the embryonic development. This is not the place to attempt a discussion of a very difficult problem, but we may cite the summing up given by one of the clearest of modern exponents—Prof. E. B. Wilson. “From the mother comes in the main the cytoplasm of the embryonic body, which is the principal substratum of growth and differentiation. From both parents comes the hereditary basis or chromatin by which these processes are controlled, and from which they receive the specific stamp of the race. From the father comes the centrosome to organize the machinery of mitotic division by which the egg splits up into the elements of the tissues, and by which each of these elements receives its quota of the common heritage of chromatin. Huxley hit the mark twoscore years ago when he compared the organism to a web of which the warp is derived from the female and woof from the male. What has since been gained is the knowledge that this web is to be sought in the chromatic substance of the nuclei, and that the centrosome is the weaver at the loom.”

The segmentation of the egg leads on to the establishment of the two primary germinal layers—the Germinal Layers. ectoderm or epiblast, and the endoderm or hypoblast. These layers are established in different ways in different types, but on the whole they give rise to similar structures throughout. The ectoderm forms especially the epidermis, the nervous system, and the foundations of the sense-organs, and a region at each end of the food-canal (fore-gut and mid-gut); the endoderm forms especially the lining of the mid-gut, and of the outgrowths which arise from it, and