

are contained in the nuclear material of each ovum and spermatozoon. The constitution of a germ cell therefore may be represented, for purposes of inheritance, as made up of a vast number of ancestral plasms, or "ids," derived from the long line of progenitors.

I need not here explain his most ingenious demonstration of the means whereby at each successive act of fertilization a certain number of these ancestral ids are discharged, so that the ovum and spermatozoon each contain half the number originally present, and so that the number of ids in the fertilized ovum is kept constant. I need but point out, in passing, that by this process of reduction the set of ids discharged from one germ cell is by this theory held to be different from that discharged from another germ cell of the same individual. And as the ids in two fertilized ova are not identical, as the same series of ancestors do not contribute to the germ plasm of the two, so it is that individual variation originates; the ids varying, the individuals controlled or developed by these ids tend to vary. So it is by this fortuitous commingling that spontaneous variation is apt to show itself.

Further, it has to be noted that when the ovum undergoes segmentation, and half of the nuclear material passes into one cell, half into the other, according to Weismann a certain definite series of these hypothetical ids passes into each cell and, according to the series entering each of them, so are determined the eventual characters of the tissues to which those daughter cells eventually give rise. The germ cells of the new individual become differentiated at a very early period, receive the full complement of the ids, and so carry on the whole series of properties inherited from the ancestors.

DIFFICULTIES IN ACCEPTING THIS THEORY.—This is a crude recapitulation of the main points of Weismann's theory. I have but mentioned those portions which especially bear upon my argument. To explain atavism, or the reproduction of characters in one generation which had not been recognizable in the previous generation but had been present in some earlier generations, you will see that the theory demands that some at least of these ancestral ids should have remained unchanged through a long period—it may be for centuries. For Darwin's case (3) of the return of features peculiar to the ancestral rock pigeon, brought about by crossing barbs, spots, and fantails, is clearly a case of atavism occurring after centuries of domestic breeding and loss of the features in question. So in such a case of atavism we must, in the terms of this theory, suppose that in the act of fertilization there is a summation and preponderance of just that series of unchanged ids which now in development lead to the bringing into evidence of the atavistic ancestral features. In other words, the theory demands that the ids must be sin-