REGENERATION, DEVELOPMENT AND GENOTYPE

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The potentialities of a many-celled plant or animal were derived through the single cell from which the development of the organism can be traced. It follows that the genotype of such an organism is the genotype of its originating cell.

This statement is wholly true, to be sure, only if during the course of development the original genotype has not been modified. Environmental influences can induce changes in chromosome number, in chromosome constitution or in genes, and hence modifications of the genotype of the affected cells. The commonest visible type of such change in plants is a doubling of the chromosome number in some or many cells. Tetraploidy, resulting from a doubling of the typical diploid number, is of common occurrence. Ordinarily the “spontaneous” appearance of tetraploid cells must be assumed to result from an unrecognized stimulus. But in some species, including hemp, melons and a number of Chenopodiaceae, tetraploidy and octoploidy are regularly characteristic of certain regions. Here the change seems pretty clearly not to result from external stimuli. It is in a real sense itself an expression of the plant’s genotype.

The extent to which a doubling of the chromosome number constitutes a genotypic modification can for the present be tested only by the examination of deliberately induced polyploids. From these it appears that the distinguishing characters of a tetra-
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