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<i>Regeneration, Development and Genotype</i> : PROFESSOR CHARLES E. ALLEN	365	<i>Scientific Books</i> :	
<i>The University and the Present Crisis</i> : PROFESSOR A. J. CARLSON	369	<i>Radiation Therapy</i> : PROFESSOR FRANCIS C. WOOD.	
<i>The University and the War</i> : PRESIDENT ARTHUR CUTTS WILLARD	372	<i>Modern Algebra</i> : PROFESSOR MORGAN WARD	384
<i>Obituary</i> :		<i>Special Articles</i> :	
<i>Robert William Hegner</i> : DR. W. W. COBT. W. L. SCOVILLE; DR. P. A. FOOTE. <i>Recent Deaths</i>	373	<i>A Note on the Hygroscopic Properties of Clothing in Relation to Human Heat Loss</i> : DR. JEAN H. NELBACH and DR. L. P. HERRINGTON. <i>Treatment of Renal Osteodystrophy with Dihydrotachysterol (A. T. 10) and Iron</i> : S. H. LIU and H. I. CHU	387
<i>Scientific Events</i> :		<i>Scientific Apparatus and Laboratory Methods</i> :	
<i>The Institute of Food Technology; The Association of College Geology Teachers; The Nineteenth Colloid Symposium; Pacific Division of the American Association for the Advancement of Science; The American Philosophical Society</i>	375	<i>Concerning the Nature of Type C Botulinus Toxin Fractions</i> : DR. DON R. COBURN. <i>A Darkening Technique for Inducing Virus Symptoms in Mature as Well as in Growing Leaves</i> : DR. E. M. HILDEBRAND and DR. O. F. CURTIS	389
<i>Scientific Notes and News</i>	377	<i>Science News</i>	8
<i>Discussion</i> :			
<i>The Earliest Account of the Association of Human Artifacts with Fossil Mammals in North America</i> : PROFESSOR M. F. ASHLEY MONTAGU. <i>Return of a Marked Salmon from a Distant Place</i> : DR. A. G. HUNTSMAN. <i>Hatching of the Blue Crab, Callinectes Sapidus Rathbun</i> : DR. MARGARET S. LOCHHEAD, DR. JOHN H. LOCHHEAD and PROFESSOR CURTIS L. NEWCOMBE. <i>The Period of Gonadal Activity in the Maryland Muskrat</i> : DR. THOMAS R. FORBES. <i>"Audience Enemies"</i> : DR. JOHN B. LUCKE, DR. GILBERT DALLDORF and DR. JEAN BROADHURST	380		
<i>Quotations</i> :			
<i>"To Do Something for the Welfare of Mankind"</i> ...	384		

REGENERATION, DEVELOPMENT AND GENOTYPE¹

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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

¹ Abridged version of a paper presented at the Fiftieth Anniversary Celebration of the University of Chicago, September 22, 1941.

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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