

# SCIENCE

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## GROWTH IN ORGANISMS<sup>1</sup>

THE main proposals discussed in this address were as follows:

1. The development of an organism from the spore or embryonic stage includes the two processes of auxesis or enlargement and of differentiation both in the single cells or elements and in the organs.

2. The present studies are based upon the conception that living matter is composed mainly of pentosans and albumins or albumin derivatives with lipins as a minor component. The proportion of the main components may vary from nearly a hundred per cent. to nearly zero.

3. The principal and characteristic substances of the two groups are practically non-diffusible and hence come together only as an intimate mixture in a colloidal condition, with varying arrangement.

4. Growth of living matter consists of hydration with accompanying swelling and of accretion of solid matter, the two processes being actually independent.

5. The hydration of the substances belonging to the two main components is affected in an opposite manner by hydrogen ions, and is variously modified by temperature and other conditions: the rate and amount of growth is a resultant of several reactions.

6. Accretions of new material include the absorption of salts which tend to restrict hydration and the incorporation of amino-compounds. So-called nutrient salts do not constitute food but may act as catalysts or releasers of energy in other substances and as controls.

7. The enlargement of cells is almost entirely by the swelling which results from hy-

<sup>1</sup> Presidential address, Pacific Division of the American Association for the Advancement of Science meeting at Pasadena, June 19, 1919. Manuscript abbreviated by the author.

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