DIFFERENCE IN THE ACTION OF RADIUM ON GREEN PLANTS IN THE PRESENCE AND ABSENCE OF LIGHT.

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Experiments by Willcock on the effect of radium radiations on \textit{Hydra viridis} and \textit{Hydra fusca} show that the green form is far more resistant to rays than the brown. The green hydras are not killed by an exposure of 4½ hours to 50 mg. of radium bromide; the brown hydras, on the other hand, die after "comparatively short exposures." I have repeated this experiment several times and have obtained the same results. Willcock also found that protozoa containing chlorophyll are uniformly more resistant than those which have none. Since these experiments were carried on in daylight, it seemed possible that the difference in the reaction between the two classes of animals experimented upon might be due to the activity of the chlorophyll.

If this assumption is correct, we should expect that plant cells radiated in complete darkness, when the chlorophyll is not active, would be more sensitive to the rays than in the light. To test this point I have made a number of experiments on \textit{Spirogyra} and \textit{Volvox}.

The radium (20.4 mg. of element, enclosed in a thin-walled silver tube) was placed in a watch-glass filled with water, and the \textit{Spirogyra} filaments were laid across it. In the light, the cells nearest the tube began to show a typical phenomenon of disintegration in 2 to 3 hours. This disintegration consists in the following.

The chlorophyll bands first contract somewhat, losing their spiral arrangement. A few minutes later they resolve into an irregular heap of chlorophyll in one end of the cell. In the light, this phenomenon began to be noticed after an exposure of from 2½ to 3 hours.

\footnote{Willcock, E. G., \textit{J. Physiol.}, 1904, xxx, 449.}
disintegration became visible in many cells simultaneously, and within 5 minutes after the disintegration began to be visible in a few cells, practically all the cells in the vicinity of the radium were thus affected.

In the dark, this phenomenon of disintegration commenced in about one-fourth of the time; namely, after an exposure of from 35 to 70 minutes, the average being 45 minutes.

Colonies of *Volvox* were exposed in a small glass tube in which the radium preparation was placed. In the light, the colonies became motionless in 2 hours; in the dark, the same condition was attained in 55 minutes. These periods represent the average of many trials.

It is very evident that the life of the cell is prolonged by some condition connected with photosynthesis; a more definite statement cannot be made on the basis of these preliminary experiments.