BIOPHYSICS

Light Works on Seeds Through Chlorophyll

Absorption High in Stimulating Red-Orange, Also in Inhibiting Violet-Blue Region

POSITIVE evidence that sunlight acts on certain seeds through chlorophyll, the green coloring matter of vegetation, was presented to the spectroscopy conference at the Massachusetts Institute of Technology by Dr. Lewis H. Flint of the U. S. Department of Agriculture.

The discovery opens a new approach to the study of light in relation to seed sprouting and growth, plant metabolism, the distribution of plants and other equally important allied problems of the science of life.

The research leading to the find was a continuation of that which Dr. Flint has been conducting on the effects of varying wavelengths of light on lettuce seed. Two years ago he reported to the conference that violet-blue light ranging between 4,400 and 4,800 Angstroms and nearly infra-red light at about 7,600 Angstroms inhibited the growth of the seeds. Yellow, orange and some types of red light, however, ranging from 5,200 to 7,000 Angstroms, were found to promote growth.

This year he announces he has narrowed the limits of the growth-giving light and that the reddish-orange light in the vicinity of 6,700 Angstroms was best for plant growth.

But most significant was his additional discovery that chlorophyll, the green coloring pigment, present in the seeds as well as in grown plants, absorbed more light at this 6,700 point and in the two inhibiting ranges than at any other bands.

"Here is an instance," he said, "in which the apparent critical wavelength of radiation promoting germination coincides with the major absorption in this region by a pigment common to all green plants. The radiation most effective in promoting germination in the seed is that most effectively absorbed by chlorophyll in the same region.

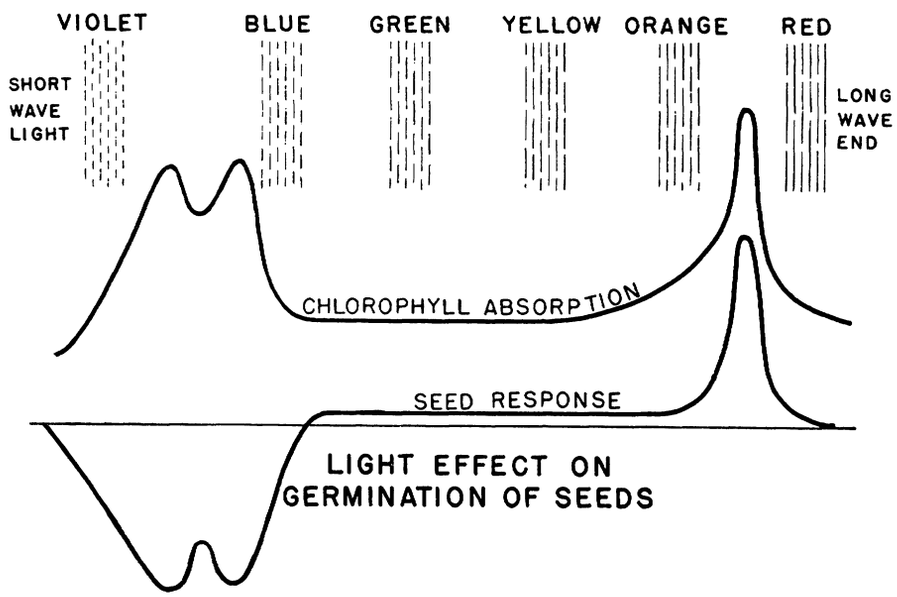
"In the violet-blue region a similar situation exists—the radiation most effective in inhibiting the germination is again that most effectively absorbed by chlorophyll. Thus chlorophyll becomes almost inevitably identified with the reactions of the seed to light, although it should be noted that the absorbed red light promotes germination and the blue light inhibits it.

"Blue light produces a set of physiological reactions quite different from that promoted by reddish-orange light, yet both groups of radiation appear associated with absorption of the respective sorts of radiation by chlorophyll.

"The close analogy places a distinct emphasis upon a new and promising viewpoint."

Dr. E. D. McAlister of the Smithsonian Institution cooperated in the research.

Science News Letter, August 1, 1936



GRAPHICALLY EXPRESSED

Dr. Flint's graph brings out strongly the high absorption by chlorophyll of light in the red-orange and violet-blue regions, and shows the striking contrast of the growth-stimulating effects of the former with the growth-inhibiting effects of the latter.

PHYSICS

New "Dimension" Added In Spectroscopic Research

A NEW method of snapping science's valuable spectroscopic pictures, which adds another "dimension" to the photograph, thus enabling investigators to ferret out minute traces of elusive elements and even to determine in what compounds various metals are present, a heretofore impossible task, was reported to the Massachusetts Institute of Technology spectroscopy conference by David Richardson, research fellow in physics at the Institute.

The discovery may be said to sharpen science's already keen tool, the spectroscope. Many among the 100 scientists attending agreed that this new technique will greatly increase the value of spectroscopy.

Ordinary spectrum photographs reveal the chemical elements present in the substance and tell roughly in how great amounts they are found. The pictures are snapped in a manner generally resembling that used in taking ordinary snapshots.

By moving the photographic plate upward at a constant rate throughout the exposure, instead of keeping it stationary, Mr. Richardson has added another "dimension" to his picture, which makes it possible to determine what is occurring at any instant during the exposure.

Greatest advantage of the new technique is its ability to tell the scientist in what chemical compound a given metal is present, an analysis not possible with ordinary methods. The standard technique, for example, can detect sodium, iron, or any other element, but does not say whether the compound in which it was present was a chloride, a