

# Plant Color Related to Blood

*Plant Physiology*

Another step in the solution of two fundamental problems of plant and animal life has been taken by Prof. Kurt Noack of Bavaria who has just shown that chlorophyll, the green coloring matter of plants, is related to blood and is derived from a substance known to biochemists as protochlorophyll.

Chlorophyll is the most abundantly produced complex organic chemical compound on the earth upon which we live, said Dr. Frank M. Schertz of the U. S. Bureau of Chemistry and Soils in explaining Prof. Noack's discoveries.

The breaking down of the chlorophyll molecule releases energy that may be manifested in many different ways. Chlorophyll in some way as yet unknown to us is directly related to the dry weight of plants, to the mineral elements found in the soil and in the plants, to the organic compounds found everywhere about us, to the electromagnetic waves which come to our planet, and most mysteriously of all to every manifestation of life we find here on earth.

"A complete understanding of chlorophyll in all its relations will aid us greatly in understanding whence we come, and whither we go," he said. "Chlorophyll is so little understood, yet it is the most important compound in all the world. It seems to be derived from protochlorophyll, a peculiar red-fluorescing pigment which is produced in seedlings grown absolutely in the dark. Protochlorophyll changes photochemically into chlorophyll upon exposure to light. Chlorophyll is an oxidation product of protochlorophyll. It is with the origin of this vitally important substance, chlorophyll, that Prof. Noack's experiments are concerned."

The work of Prof. Noack has shown very clearly a relation between the green pigment found in leaves and the red pigment of blood, although just how the blood pigment is formed from the chlorophyll has not yet been determined.

How hemoglobin, the substance which gives the red color to blood, is formed from chlorophyll has been a much disputed subject among

scientists. Prof. Noack's experiments lend definite support to this theory. In the galls of animals that have been fed on green fodder is found phylloerythrin, a substance basically related to hemoglobin. On the other hand, this phylloerythrin, which is formed in the animal body from the chlorophyll of the green fodder, is chemically very similar to protophaeophytin in a direct derivative of protochlorophyll, the same pigment which constitutes the first step in the formation of chlorophyll itself.

The origin of chlorophyll, on which Prof. Noack's work touches, is the first of two problems very important in biochemistry, Dr. Schertz commented. When scientists find how protochlorophyll is produced, this first problem will be solved. The second problem concerns the way in which blood pigment is produced from chlorophyll. These two important problems must sooner or later be solved by biochemists as they are most fundamental in all plant and animal life.

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## Milk No Liver Substitute

*Physiology*

Attempts to increase the nutritional value of milk by the simple technique of giving cows and goats more copper salts in their food than they would normally have access to, has failed to work.

The valuable factor in liver, which has become the up-to-date physician's most substantial prop in treating pernicious anemia, was recently found by Dr. E. B. Hart and a group of investigators at the University of Wisconsin to be copper rather than iron, as was first believed. Liver, in the proportions necessary to produce curative effects, becomes an exceedingly disagreeable medicine to many patients. Other foods, consequently, that supply the needed element are highly desirable.

Naturally the Wisconsin investigators turned their thoughts to various ways of increasing the copper content in other foods. Milk, which in earlier analyses, showed from .38 to 1.4 milligrams of copper per liter, was found under carefully controlled conditions to have only .123 to .184 milligrams per liter, not sufficient to prevent rats, fed on a milk diet,

from developing anemia. The earlier figures are believed to be the result of contamination with copper from metal vessels used during analysis.

Cows and goats fed on an experimental diet showed milk with the same proportion of copper as that found in the recent analyses. Increasing the copper content of their food even in considerable proportions, however, did not produce any increase in the amount of the element in their milk. So anemia patients can't look to milk for relief from liver.

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## Clock Tells World Time

*Horology*

A clock without hands that tells the time in any part of the world is one of the chief attractions among the American exhibits at the Ibero-American Exposition at Seville. The outer part of the dial shows the longitude for any part of the earth and an inner revolving disc is divided into the twenty-four hours of the day. The figure opposite any longitude gives the time at that place.

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## Intelligence and Skill

*Psychology*

Tests made at Cleveland of the manual dexterity of children of both normal and superior intelligence indicate that those of average mentality are equal to their brighter fellows in ability to work with the hands.

The tests were given by Dr. Frieda A. Kiefer, of Watertown, Mass., to a group of 95 superior children and another group of 97 children with normal "IQ's". The ages ranged from 8 to 12 years.

The tests were varied enough to show several different types of physical ability. One measured strength of grip; for this a galvanometer was used. Another measured the rapidity with which the child could tap on a telegraph key. Two tests measured steadiness of the hand; for these electrical devices were used so constructed that the slightest quiver of the hand holding a pencil would make a contact and cause a little click in the machine. The final test indicated the child's ability to control the movement of his hand; he was asked to move a rod a certain distance along a measuring rod, always stopping at the same place.

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