

No Heartbeats in Plants

Botany

"Hearts" in plants, propelling the sap upward by rhythmic beats, are denied any real existence by several American and European plant physiologists, whose repetitions of the widely heralded experiments of Sir Jagadis Chunder Bose have not given results like those claimed by the Indian scientist. The "pulsations" shown on his records, they state, are due simply to the tremors of imperfectly adjusted instruments, and when these sources of error are eliminated the apparent pulsations vanish immediately. Without these precautions, a round lampwick soaked in cabbage juice shows "pulsations" of exactly the same kind detected in the living stem of a plant.

The newest attack on the Bose theories is by Dr. G. A. Persson of Mt. Clements, Mich., in an article which appears in the *Scientific American*. Dr. Persson, a physician interested in the physiological effects of poisons, was attracted to the Bose experiments by the reported effects of strychnine and other drugs on the "heart-action" of plants. He and his assistant built duplicates of two of

Dr. Bose's pieces of apparatus, the electric probe and the sphygmograph.

Both of these instruments are supposed to register minute increases and decreases in the diameter of plant stems, making them readable to the naked eye by deflections on the scale of a sensitive galvanometer. Dr. Persson did get wiggly-line tracings that resembled those of Dr. Bose; but he states that when he carefully insulated his apparatus against vibration and electrical disturbance, and refrained from walking near his plant or causing any air currents in its neighborhood, the apparent pulsations stopped completely.

These negative results agree with those of an Irish scientist, Prof. H. H. Dixon of the University of Dublin. Prof. Dixon built an electric probe some time ago and also a third instrument used by Dr. Bose, called a quadrant electrometer. He was not able to detect any heart-like pulsing in plants with either of these pieces of apparatus.

Prof. Dixon, following some preliminary work done by other experimenters on the continent of Europe,

was able some years ago to demonstrate that a continuous column of water in a sealed vessel has a strength like a woven rope, resisting a breaking strain of several hundreds of pounds per square inch. This tensile strength of water is sufficient to pull sap up to the tops of the tallest trees as though each microscopic water tube in the sapwood had a slender steel wire strung through it. The evaporation at the leaf-surfaces furnishes the pull, according to Prof. Dixon's theory, and the water-columns themselves act as cords to lift themselves.

Almost all plant physiologists have now accepted Prof. Dixon's hypothesis of the ascent of sap. Among the most notable of his American supporters is Dr. D. T. MacDougal of the Carnegie Institution of Washington, who has tested the theory on a large scale at the Coastal Laboratory at Carmel, Calif., of which he is director. The results of these experiments, Dr. MacDougal states, are a confirmation of Prof. Dixon's ideas and a refutation of those of Dr. Bose.

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Asparagus Vitamins

Physiological Chemistry

Thick, white asparagus sprouts are rather more fashionable than their green brothers, but they are lacking in vitamin A. So if you rely on asparagus for your vitamins, you must eat the green variety, or you will not be getting enough vitamin A in your daily diet.

Experiments carried out by Prof. J. W. Crist and Prof. Marie Dye at the Michigan State College showed that green asparagus, whether freshly cooked or canned, contained enough vitamin A to promote health and growth when fed daily to white rats. These animals are the ones regularly used to test the vitamin content of foods. When they were fed the blanched or white asparagus without any other source of vitamin I in their diet, they died as rapidly as on the control diet containing no asparagus and also no vitamin A. Evidently blanched asparagus gives no stimulant to health and growth.

Prof. Crist and Prof. Dye believe a relationship exists between vitamin A content and the development of chlorophyll, the green coloring matter of plants.

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Hay Fever Season Opens

Hygiene

Little grains of pollen blown on an April breeze may be the innocent cause of many sneezes from early hay fever sufferers. The season for this trying malady is now at hand and, in the opinion of medical specialists, hay fever victims should arrange to be desensitized without delay.

While pollen from summer and fall grasses and weeds causes most of the hay fever, there is an early variety due to certain trees and shrubs that blossom early. In warm climates this may be mistaken for a common cold of late winter. Rose fever is one name given to this early variety of the malady, though it is caused by many plants besides roses.

As a matter of fact, it is a protein substance in the pollen of plants that causes hay fever. Some persons get it from protein in foods, animal hair or feathers, glue, horn rimmed glasses, and many other queer and unexpected sources. Physicians have devised a way of testing which pollen or protein is the cause of hay fever in any given person. Treatment to make the person less sensi-

tive to the guilty substance may then be instituted. An amount of the particular protein so small that it will not cause a reaction is injected under the skin of the patient. This is done about once a week, gradually increasing the amount of protein injected, until the test shows that the patient no longer has any reaction to it.

Treatment is generally started about fifteen or sixteen weeks before the time the hay fever customarily begins. It will not help all the sufferers, but 25 per cent. can be completely relieved.

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Too Many "Outlines"

General Science

WILLIAM LYON PHELPS in a letter to the American Philosophical Society:

"The world's intellectual need is more sound culture, that is, both science and the humanities, based on knowledge. I think the various 'outlines' published today, while they may accomplish some good, do a great deal of harm in persuading some people that there is an easy way to knowledge."

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