

## SCIENTISTS SHOW WHERE ROOTS GET AIR TO BREATHE

Plants breathe with their feet as well as with their heads, and there is oxygen enough in good garden soil for their needs. These are discoveries of Prof. Burton E. Livingston of the Johns Hopkins University and Dr. Lee M. Hutchins of the U. S. Department of Agriculture, working in the former's laboratory of plant physiology.

Earlier work by these men and by other scientists had already established the fact that plants must get their oxygen through their roots as well as through their leaves, and that air taken in through the top of the plant does the roots little or no good in most species. It has, of course, been long observed that many kinds of plants "drown" when they stand for a considerable period of time in flooded land, even though their tops may be above the water. This "drowning" of a plant is exactly like the drowning of a man: both die of suffocation, or lack of oxygen. That the plant has its head above water does it no good; it has no lungs or circulatory system to pass the air down to its roots, and if they can not get oxygen from the soil they can not get it at all.

Livingston and Hutchins then proceeded to develop a most ingenious method for measuring how much oxygen the soil can supply in a given time. A cone-shaped filter of thin porous porcelain is sunk into the soil to be studied, and allowed to remain until the earth settles around it. Then nitrogen, from which the last trace of oxygen has been extracted, is fed slowly through from a storage tank, and as it passes out again is run through a "sikytu" solution of pyrogallol, a chemical that turns brown in the presence of oxygen, and can be used to measure the amount that has come in through the walls of the filter.

By this method it was found that three factors influence the rate at which oxygen can pass through the soil to the roots of plants. Tightly packed soils can supply little oxygen, while well-cultivated soils pass it through easily. The rate of supply depends also on the amount of water present: the more nearly water logged the soil the lower the rate of oxygen movement. Finally, the deeper the soil level the slower is the rate of supply.

The natural distribution of plants is governed at least in part by the amount of oxygen their roots need. Plants of wet habitats, like rice, willows and cattails, require little oxygen for their roots; corn, potatoes and other crops of well-cultivated lands require a great deal. Ordinary forest trees for the most part occupy an intermediate position. It is expected that the new method will in time yield data of great value in botany, agriculture and forestry.

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YELLOW FEVER NOW MAKING LAST STAND

Yellow fever is making its last stand in the Western hemisphere.

Entirely eliminated from the West Coast of South America and Mexico it still persists in Colombia and northern Brazil, where work of the Rockefeller Institute now is being centered.

Nicaragua and Guatemala, once pest holes, have not reported a single case since 1921. Control operations were formally closed in Mexico last year. British Honduras has not had a case for four years.

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