HORTICULTURE

Science Stunts for the Gardener

Experiments Formerly Conducted Only in Laboratory Now Provide Bigger and Better Flowers and Vegetables

By DR. FRANK THONE

GARDENING, this spring, can be made a very exciting activity. For along with the regular, down-on-your-knees, dirt - under - the - fingernails grubbing that has made up the bulk of gardening from Adam's day to ours, it is now possible for the ordinary, everyday, garden variety of gardener to do some of the fascinating tricks with plants that have hitherto been the monopoly of scientists only.

This has come as a direct response to popular demand. During the last few years, a number of new discoveries about the growing and handling of plants have been announced, of evident practical usefulness as well as scientific importance.

People immediately began demanding, "Where can I get it?" "How can I learn how to do it?" Until at last in sheer self-defense the scientists have had to produce popular books explaining how, and the chemical companies have begun putting up the necessary materials in small, ready-to-use packets, and have inserted advertisements in all the gardening and country-life magazines.

Of all the new techniques, perhaps the one that has aroused most general interest is the trick of growing plants without soil. It has come to be known by several names: soilless gardening, dirtless farming, solution culture, hydroponics.

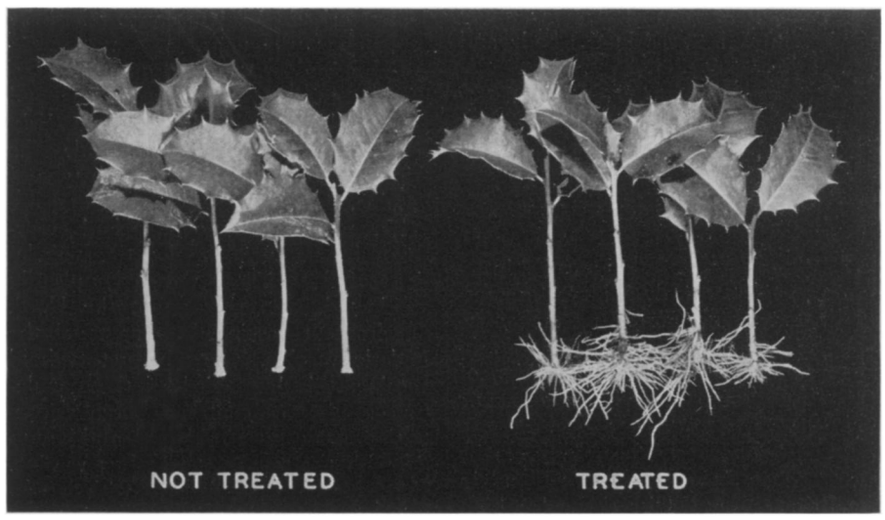
The latter term is the invention of Dr. W. F. Gericke of Berkeley, Calif., who has pioneered the field of putting this method on a large-scale, commercial basis. He uses big, shallow tanks or basins, over which the plants are held in a few inches of excelsior, sawdust or other non-soil material on wire netting, while their roots dangle in the water beneath, receiving the necessary mineral salts in solution. Sometimes electric heating cables laid on the bottom of the basin provide added warmth to speed the plants' growth rate.

Hydroponics can be applied on small as well as large scale, with anything from a single plant growing with its roots imersed in a quart jar of culture solution up to tubs or big crocks with small gardens suspended above them, sunk to the rim in lawn or shrubbery.

Less radical in appearance, though essentially the same in principle, is the method of growing plants in sterile sand or crushed gravel, with the nutrient chemical solution kept slowly and constantly trickling through. This technique was first worked out by Dr. J. W. Shive of Rutgers University. Like Dr. Gericke's hydroponics, it has been applied to large-scale operations by commercial greenhousemen, but is also adaptable to small-scale, home use.

Several firms are offering both equipment and prepared chemicals for home gravel-culture set-ups, and many of them are quite attractive in appearance as well as mechanically practical. The culture solution is trickled out of a reservoir through a slender siphon or led through a thick wick of woven glass fibers, that will not clog or decay.

There is nothing secret about the tablets or stock solutions of prepared chemicals that are sold for use with either the hydroponic or the gravel-culture method. Their formulae have been used in laboratories for several generations; their ready-mixed form (at of course a usually higher price) is simply a matter of con-



FOR SLIPS

Abundant root growth produced on cuttings of holly by treatment with indole butyric acid solution at Boyce Thompson Institution for Plant Research. Untreated holly cuttings (at left) simply refuse to grow any roots for the plant ordinarily is one of the most difficult to grow by cuttings.

FLOWERS THRIVE

One of Dr. Gericke's hydroponic basins producing a crop of gorgeous roses. Recently the California scientist has developed a multiple cropping system, growing two or more kinds of flowers or vegetables in the same basin.

venience for the home gardener, who does not have the delicate chemical balances necessary for weighing out exact quantities to fit the published formulae.

Of at least equal interest to the practical home gardener is the use of growth-promoting substances, or synthetic plant hormones, to induce the formation of roots on slips or cuttings that ordinarily produce very scanty roots or none at all. Plants form these hormones themselves, but scientists have discovered that certain complex organic compounds, like indole acetic acid and indole butyric acid, will do the work perfectly well; and these acids of course can be produced synthetically.

They are quite expensive, so that it is just as well that a very little of them goes a long way. Dilutions of a few parts of acid per hundred thousand parts of water will start roots on stubborn cuttings that have been dipped in them.

No Hormone For Branches

Unfortunately, no corresponding substances have yet been found that will induce the formation of branches, although much research effort has been spent in that direction. However, the growth substances already known have been successfully used in several other interesting ways: production of seedless tomatoes, melons, etc., from unpollinated flowers, spraying to prevent premature wholesale dropping of young apples, and so on.

Tremendous interest, and a good deal of controversy, has been stirred up by the discovery that one of the "human" vitamins, thiamin chloride or vitamin B_1, is necessary for the growth of roots. Good results following the use of this vitamin in certain types of sterile soils have been followed by its wholesale application in all kinds of gardening situations, with the result that amateur and professional gardeners alike have been divided into excited, name-calling partizan camps.

Probably the safest advice is: If you are interested, try B_1 for yourself under what scientists call "control" conditions. That is, use it according to directions on one set of plants. Grow a similar set of plants under exactly the same conditions of soil, water, sunshine, etc., but give them no B_1. Judge by your own results whether the vitamin is what is needed under your particular working conditions.

Make New Varieties

It is even possible for the ordinary gardener to enjoy the thrill of creation, by producing a new, and possibly giant, flower or vegetable variety. Formerly this could be done only through the exceedingly tedious process of hand-pollinations and subsequent growing of the hybrid seed—if any seed set.

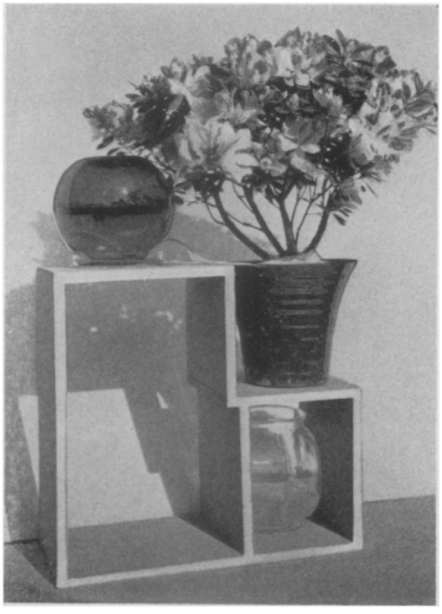
Now, it is possible to treat growing parts of stems with a solution of colchicine, an ancient gout cure diverted to a newer and more exciting use. Colchicine is a poison. It causes abnormal patches of tissue to form in the stem. Some of these may subsequently produce branches, and the branches will have flowers unlike those of the parent plant. Their seeds, also, will carry the new characters, and often grow into plants much bigger than the parent, and sometimes of strange and striking form.

For further information on newest

●RADIO

Prof. Dayton C. Miller of the Case School of Applied Science will discuss "The Pipes of Pan, Old and New," as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, April 18, 4:15 p.m., EST, 3:15 CST, 2:15 MST, 1:15 PST.

Listen in on your local station. Listen in each Thursday.



MODERN

In this home gravel-culture setup, nutrient solution is fed from reservoir at left into the flowerpot; excess slowly drips into bowl beneath.

things in scientific gardening, send a three-cent stamp to SCIENCE NEWS LETTER, *2101 Constitution Ave., Washington, D. C. Ask for the Gardening Bulletin.*

Science News Letter, April 13, 1940

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ington University, St. Louis, warned.

Dr. Julianelle calls the new disease Listerellosis because it is caused by a bacterial species named Listerella.

More and more patients with a peculiarly fatal form of meningitis due to these germs are being seen, Dr. Julianelle said. Common and severe animal diseases due to these germs have been generally recognized since 1926. Dr. Julianelle believes the animals may serve as reservoir for the infection which is right now in process of becoming a human plague. The germs fall into two classes, one characteristic of rodents and the other characteristic of ruminant animals such as cows. Both kinds of germs have been found in human patients.

Medical preparedness against this future plague is called for, Dr. Julianelle stated.

Science News Letter, April 13, 1940

Hope for Thrombosis

GREATEST hope for victims of the heart disease, coronary thrombosis, lies in development of new drugs to dilate the tiny arteries of the heart, Dr. Fred M. Smith of Iowa City declared at the meeting of the American College of Physicians.

One such drug is aminophyllin, which can be injected directly into the patient's vein. Others are theobromine and theophyllin and Dr. Smith said that medical researchers are now trying to develop still more effective medicines of this type.

The outlook for patients with coronary thrombosis has improved remarkably within the past 10 or 15 years, he said. This is partly due to better methods of treatment and partly to the fact that the condition is being recognized more often and treated earlier.

In this form of heart disease, the larger blood vessels supplying the heart itself with blood may become blocked. The very small arteries in the same region then try to take over the job of carrying blood to the heart. If these little arteries called arterioles, succeed, the patient has a good chance of living out his normal life span. The new medicines Dr. Smith described are helpful because they dilate these small arteries and thus enable them to carry more blood to the heart.

Drugs are only one aspect of treatment of this form of heart disease, Dr. Smith emphasized. General care is also tremendously important.

Science News Letter, April 13, 1940

Better Chemical Treatment

THE CHEMICAL curing of disease, widely practised since the discovery of sulfanilamide, can develop along rational and presumably more effective lines as a result of discovery of the most powerful known germ-killing chemicals, substances produced by bacteria that live in the soil, Dr. René J. Dubos, of the Hospital of the Rockefeller Institute for Medical Research, predicted at the meeting of the American College of Physicians, Cleveland.

For his discovery of potent germ-killers produced by soil bacteria, Dr. Dubos received at this meeting the John Phillips Memorial Award of the College.

The new germ-killing chemicals can protect mice against pneumonia and against streptococcus infection, but it may be many years before they are ready for use in treating human patients.

In the test tube, the soil bacteria chemicals can kill pneumonia germs, streptococci, staphylococci, diphtheria bacilli and numerous other dangerous germs. One of the chemicals, gramacidin, is so powerful that less than one grain of it (0.002 milligrams) can protect a mouse against 10,000 fatal doses of pneumonia germs or streptococci.

While the soil bacteria chemicals are very potent killers of one class of germs, called Gram positive, they are less effective against the Gram negative class of germs to which belong the gonococci and meningococci. When the differences between these two classes of germs which make them respond differently to Gram's stain and to the new chemicals are understood, scientists may have important knowledge for dealing with the general problem of antisepsis, Dr. Dubos said. Meanwhile, he indicated, chemical studies now in progress of the structure of the new germ-killers from soil bacteria may "suggest new lines of investigation for the development of chemotherapy on a rational basis."

Science News Letter, April 13, 1940

To help passengers find their way aboard trains these black-out nights, Germany is trying the *electric eye* device, which automatically turns on lights at the platform edge when a train pulls in.