SCIENCE NEWS

Science Service, Washington, D. C.

THE BLISTER RUST AND THE SUGAR PINE

THE blister rust which has wrought such havoc with the white pines of the East is less than two hundred miles from the great sugar-pine forests of Oregon and California. The western white pine and sugar pine are among the most valuable timber trees of the West, and the federal government, itself a large owner of these species in the national forests, is vitally concerned in their preservation from the pest.

S. B. Detweiler, in charge of the office of blister rust control, U. S. Department of Agriculture, stated that recent advances of the rust while greatly to be regretted were inevitable. The continued spread of the disease is to be expected until it reaches the limits of white-pine growth, but while it can not be prevented it can be materially slowed down.

The Bureau of Plant Industry has had under way a program of local control in the East since 1922. Through the cooperation of state forestry officials and state extension agents efficient measures have been in operation that have cut down appreciably the loss in the white pine forests of New York and New England.

Curiously enough, this parasitic menace of the white pine is eradicated by uprooting currant and gooseberry bushes in the neighborhood of the pine timber stands. The blister rust is a fungus with a complicated life history, part of which is spent on the leaves of the botanical genus Ribes, a group which takes in all the cultivated and wild currants and gooseberries. It can not spread from tree to tree like chestnut blight, but has to go from the pine to the leaves of the currant or gooseberry; and this gives the forester the means of control. Trees can not be conveniently rooted up but bushes can; so all the currants and gooseberries must be eliminated, particularly the cultivated black currant, which has proved to be a host *par excellence* for rust spores from pine trees even as far away as a mile. For while the spores from pine trees can not infect other pine trees the ones from currants can infect other currants so that the disease spreads rapidly through a whole patch, thus materially increasing the radius of the spores. The blister rust control agents, with the assistance of state and county officials as well as the general public, are clearing about a million acres of black currants a year in the forest regions of the Northeast.

The blister rust first reached the West at Vancouver, B. C., in a shipment of pine seedlings from France. It was discovered by forest officials in Washington and British Columbia in 1921 and in Oregon in 1922. By 1924 a program was under way to keep it under control, in which federal and state officials as well as private interests were coordinated.

The vast acreage of western forests, running into millions, made the problem much more difficult than in the East. The first step was to put into effect a rigid quarantine to prohibit any of the host plants of the rust being shipped into the West. Next a systematic effort was made to eradicate completely the black currant from the states of Montana, Washington, Idaho, Oregon and California. Through this foresight it is hoped to cut down the chances of infection before it can make any very damaging spread in these states. Already the end of 1925 has seen Idaho and Oregon practically clear of dangerous black currants.

Effective control work can only be done before the trees are seriously attacked. In consequence a general campaign is under way to educate the people in the knowledge that if the timber is to be saved the currants and gooseberry bushes must go.

WINGED TREE SEEDS

THAT the winged seeds of the Douglas fir, principal timber tree of the Northwest, can travel surprising distances in even a moderate wind has been demonstrated by an experiment performed by the foresters of the Pacific Northwest Experiment Station at Pearson flying field at Vancouver. This test yielded data of value in determining the number of trees which should be left for reseeding purposes when an area is cleared of its timber.

In the experiment, a box kite carrying a carton of Douglas fir seed was sent up in an eight-mile wind, and when it had reached the height of a full-grown cone-bearing tree the seeds were released by a suitable mechanism. Observers stationed by canvas sheets spread on the ground at various distances down the wind watched the flight of the seeds, and counted the numbers falling on their sheets, from which the number of falling seeds per acre were calculated.

The winged seeds, their downward flight retarded by the spinning motion given them by their wings, formed a tiny cloud which floated down the wind taking a direct and narrow course, relatively few falling for several hundred feet. The catch on the canvas on the 600-foot line showed a seed-fall at the rate of 250 winged seed to the acre. At 850 feet it has increased to 40,000, and at 1,100 feet out from the kite, 302 seed fell on a canvas 11 by 15 feet, or at the maximum rate of 80,000 seed to the acre. The most distant line of canvases, 1,600 feet out, showed that the fall had again decreased to 250 to the acre. Some seed traveled a considerable distance beyond this point as men stationed at the last canvas saw seed still several feet in the air passing them.

OYSTER CULTURE

"BACK to nature" is the slogan of the experts who are trying to coax the oyster back to its old-time productivity. Oysters live, thrive, increase and multiply best in the brackish waters of our coastal estuaries and harbors, according to H. F. Prytherch, of the U. S. Bureau of Fisheries. At the experimental shellfish laboratories at Milford Harbor, Conn., experiments have been made to determine if oysters can not be induced to become as plentiful in their native haunts along the New England

coast as they were in the days of Massasoit and Miles Standish.

The oyster spawn is microscopic in size and for two weeks exists in a free swimming larval state carried hither and thither by the waves and the tide. The great keynote of oyster culture is to get the largest number possible of the baby oysters to "set" upon some stationary object at the end of the free-swimming stage. Once set the oysters can not move of themselves. The full grown marketable adults can readily be collected from whatever planted material, usually old oyster shells, have been used to catch the young ones or "spat."

At Milford Harbor for the past four years many experiments have been carried out in the study of the life history of the oyster, particularly the free-swimming stage. Very few larvae are found in the water in the interval between spawning and the time for them to set. The investigations this summer show that the larva lives part of the time on the bottom during this period, pulling itself along by means of a muscular foot, like a clam. This interesting discovery has enabled investigators to understand much better the relationship of spawning beds and setting areas and the effect of tides and currents on distribution.

Rocks, shells, glazed tile and objects of many sorts were tried out as collectors for the "spat." Birch brush, bearing dozens of tiny oysters planted in rows in the tidal flats, presented the aspect of what might be called an oyster garden. The outstanding results of the summer's work show that millions of seed oysters can be produced when natural conditions of breeding are reproduced. Protection of these inshore areas is essential if the oyster is to continue to be a delicacy of the American table.

Thousands of dollars have been spent by commercial enterprises sowing oyster shells to collect seed oysters, with steadily decreasing results. In years past when the oyster industry had been successful in obtaining yearly crops of oysters there were large natural beds located in the harbors, bays and river mouths where the conditions were favorable for the production of a vast quantity of spawn. To-day these valuable areas have been destroyed by excessive pollution from factories and by overfishing so that only the deep water beds remain for the production of seed oysters.

When spring and summer weather conditions in deep beds resemble those normally existing in the harbors and estuaries, oyster culture is successful, but unfortunately this happens only occasionally. Connecticut recently passed a law enforcing the control and elimination of pollution in its harbors. The enactment and enforcement of such legislation in other oyster-growing states would do more than any other one thing to increase the existing supply of oysters. This spring the Bureau of Fisheries intends to undertake an investigation of the coast of South Carolina to ascertain the possibilities for oyster propagation in the South. A similar survey of Texas is already under way.

BLOOD TESTS FOR WHOOPING COUGH

Dr. C. F. Powers, of the Yale Medical School, has ascertained by chemical examination that the calcium content of the blood of patients suffering from severe cases of whooping cough is very low. This he remedies by administering calcium chloride. He also advocates applications of radiant energy or X-rays for what he calls the electrical hyperirritability of the nerves or convulsions. These are measures for bad cases that are complicated by a previous condition of rickets, but even for children with the more moderate form of the disease without complications, Dr. Powers recommends X-rays.

Ether is occasionally resorted to to quiet the more violent paroxysms, while for all degrees of whooping cough the best all round remedy is codliver oil, because it helps build up against the condition of malnutrition that often persists till long after the last final whoop.

Dr. J. C. Regan and Dr. A. V. Tolstoouhov, of Brooklyn, have found in making chemical analyses of the blood of whooping-cough patients that the hydrogen ion concentration, that is, the acidity of the blood, is greatly lessened in proportion to the severity of the disease. They also noted a considerable decrease in the amount of phosphorus. Just what use can be made of the knowledge of these interesting changes is not yet determined.

Physicians who specialize in the diseases of children use a blood test in diagnosing doubtful cases. It consists of counting the number of white-blood cells which increase greatly if whooping cough is really present. It is not certain, but is often of great assistance when considered in connection with other symptoms, for it is very important to keep even the mild cases isolated so that they may not infect other children.

HORTICULTURAL ART OF THE ANCIENT MEXICANS

Not only the gardens of Montezuma, but the picture writing of his subjects prove the ancient Mexicans to have been great horticulturists. Their descendants still use their complex system of botanical names, a system which conveys information as to qualities, characteristics and habitat of many plants.

Wilson Popenoe, formerly of the U. S. Department of Agriculture, in a paper on "Plants of Aztec Picture Writing" gives a long list of botanical figures used in Aztecan hieroglyphics. The flower symbol recurs constantly in all sorts of combinations as a place name. Maize, an important feature in all Indian life, appears frequently along with the sweet potato, the black bean, the cherry, plum, avocado and various less known native fruits. Most interesting is a combination of the water sign with the conventionalized sign for cultivated ground meaning "place where the land is irrigated." The familiar desert features, the yucca, the cactus and the mesquite, are all represented, but the gem of Mr. Popenoe's collection is the picture symbol which directly translated means "flea pepper," a fitting name for the biting, red hot pepper of the southwest.

The floating gardens of Mexico City, so famous during the conquest, may still be considered one of the best expressions of the native horticultural art. Willow trees are planted in the shallow water of Lake Xochimilcho in plots varying from 200 to 2,000 square feet. Their interlacing roots form a sort of basketwork that holds the soil with which the plots are filled while their tops are

kept pruned so as not to shade too heavily the plants cultivated on the islands. The inhabitants of Mexico City are supplied to this day with vegetables, corn and flowers raised on these esthetic truck farms.

EVOLUTIONARY EVIDENCE HIDDEN IN HUMAN VEINS

HIDDEN away in the interior of man's veins are indications that his ancestors once walked in a stooping position, according to Dr. C. W. Stiles, of the U. S. Public Health Service.

In the veins of human beings, as well as of the lower animals, Dr. Stiles stated, there are numerous little check-valves, that relieve the back-pressure of the blood and prevent it from flowing the wrong way. In all cases in animals, these valves are found in veins where the blood commonly flows "uphill" toward the heart, as in the veins of the legs and arms. In animals the blood must flow "uphill" also in the veins that lie beneath the ribs, since the animals carry the trunk of the body horizontally and the ribs therefore hang vertically. But in the veins that run horizontally, notably the great trunk vein that runs along beneath the backbone, no valves are needed to prevent back pressure, and none are found in this position.

In man, however, the trunk is carried vertically, so that the relative positions of the veins are exactly opposite to those in the animals, the rib-veins being horizontal instead of vertical and the great vein of the back being vertical instead of horizontal. Yet the valves in human veins follow the same pattern as do the valves in animal veins. They are found in the rib veins where they are not needed and are absent from the great dorsal vein where they would be really useful. This is understandable on a theory of ancestral survivals in man, but is completely contrary to a special-creation theory which assumes that the body of man is perfectly adapted for his present mode of life and made without any useless parts or any mistakes.

ITEMS

ELECTRIC light bulbs are not the only things that contain argon. This supposedly rare inert gaseous element has lately been discovered in the cells of a number of organisms, and is presumably present in the cells of all living things. A French scientist, A. Pictet, reported recently before the Paris Academy of Sciences that he and two associates had extracted a little less than a third of a cubic centimeter of the gas from a gram of dried yeast, and that they had later found it also in sheeps' brains and in the blood of oxen. They explain its presence on the hypothesis that the gas, being exceedingly inactive chemically, slowly accumulates in the cells as it is carried there, and has no means of elimination because it does not combine with other elements. It thus remains stored in the cells until their death and disintegration.

COUNTRY doctors can now send a specimen of a patient's blood through the mail and have it correctly analyzed in the most up to date metropolitan laboratories hundreds of miles away. Dr. Henry J. John, of the Cleveland Clinic, in a forthcoming issue of *Archives of Pathology*, describes a vacuum tube for collecting and preserving blood samples. It will hold about one and a half cubic inches of blood and contains a small quantity of a drug, fluoride thymol, in the form of a powder, which prevents the blood from clotting and preserves it in the original condition in which it was taken from the patient. The tube is easily used and will doubtless prove of great value not only to the practitioners who do not have access to a laboratory, but to insurance companies, many of which are now requesting blood sugar tests of applicants for policies.

IT comes as a surprise to the world at large, which does not think of England as an agricultural country, to realize that it is spending annually over $670,000 to further agricultural research. An extensive system is in operation with plans for still greater building to bring scientific knowledge and methods directly to the aid of the English farmer. Over $70,000 yearly go to the maintenance of advisory centers to provide for investigation of purely local problems. The farmers themselves are keenly interested and night schools and "discussion societies" are a great success and flourish in increasing numbers. Poultry raising and various branches of horticulture have made great advances while the whole dairy industry has taken huge strides forward as the advantages of pure bred stock have been apparent to the dairyman. The Ministry of Agriculture has been making grants to the agricultural departments of various colleges for extension work. The government is making serious efforts at efficient coordination of the whole enterprise, for it is generally felt that the back-to-the-land movement holds great promise economically for England's future.

RADIO is being used to help save the ruffed grouse from extinction. This once common game bird, colloquially known as partridge, has been gradually disappearing from our northern woods for years in spite of attempts of state game associations to restock the supply. Experts have ascribed this decline to various parasites and several diseases, but very little is known as to their true nature. By radio the general public was asked to bring in any dead or wounded birds, so that scientists could study them and determine the cause of their scarcity. Thornton W. Burgess, of Peter Rabbit fame, from WBZ appealed to thousands of members of his Radio Nature League, scattered throughout New England and Canada, for their cooperation with the results that a steady stream of specimens has been pouring in. These are being turned over to Dr. A. O. Gross, of Bowdoin College, Maine; Dr. A. A. Allen, at Cornell University, and Dr. E. E. Tyzzer, of the Harvard Medical School, for investigation. Important information on the number and condition of ruffed grouse over a wide territory has also been sent in. Dr. John C. Phillips, of Harvard, who headed the movement, declared there is hope that enough information on grouse habits and diseases will be collected to restore eventually the ruffed grouse to normal abundance in the northern states.