SCIENCE NEWS

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PLANT ENGINEERING

"PLANT ENGINEERING" as an important aid to enterprising horticulturists was forecast by Dr. Frits W. Went, of the California Institute of Technology, who spoke recently at Los Angeles.

The speaker's play on words does not refer to mechanical engineering in the common sense, however. The plant physiologist meant literally what he said, *viz.*, the constructive engineering of living plants, with the aim of producing more satisfactory crops. Nominally this may mean the making of big plants where only little ones have hitherto grown; but actually by indirect reaction the plan may bring improvement in quality as well.

The time-honored methods of improving on forms of vegetation, such as seed selection and hybridization, have well-known limitations. The plant breeder often produces trees with superb quality of fruit, but with poor yield, poor resistance to pests, disease or harsh climate, and worst of all, dwarf growth habits. At this point Dr. Went proposes to use growth hormones, which are potent organic chemical compounds that may happen to be missing in the case at hand. He considers it not impossible that a vegetable dwarf of choice quality may be led to develop to unprecedented size. If hormone treatment can be made to solve the problem of size and rate of growth, then much greater freedom is allowed to the expert in pollination and hybridization.

The hormone may be administered in the manner of either soluble chemical fertilizer or spray, or by soaking parts of plants or seeds. Unlike fertilizers, the hormones are applied only in extremely dilute form. For example, the rare chemical indoleacetic acid, which has exhibited high hormone potency, may be mixed with as much as ten thousand parts of water for use in soaking cuttings which one wishes to root rapidly and vigorously.

Hormone application has reference to certain cases where it is not practical to propagate a plant from seed. Such varieties are of course commonly grafted or budded upon robust seedling plants. Unfortunately the graft junction often seems to constitute at least a partial barrier to growth hormones which should be passing regularly from root to tree-top. As a result many grafted plants are somewhat dwarfed. Artificial application of hormones thus provides the remedy, assuring adequate growth.

LUEBECK RESTORATIONS OF ANCIENT HOUSES

HOUSES in which our ancestors lived at the time of Christ, and 2,000 years before then, are shown restored in full size and original condition at a new open-air museum in the North German city of Luebeck. They may be considered ancestral homes of Englishmen as well as of Continental Germanic-speaking peoples, for the tribes that colonized Britain and gave rise to what we call the Anglo-Saxon culture started from this part of the European mainland.

The two houses stand a little distance from each other in the park, each an exact restoration in architecture, building materials and interior furnishings, according to the best information scientists have been able to obtain.

The restoration of the older of the two houses, showing a New Stone Age farmstead of about 2000 B. C., is a rectangular building with a steeply pitched roof of thatch. The ridgepole of the roof is supported on two stout upright posts and projects at either end.

The framework of the house is of stout, rough, unsquared timbers, and the spaces between are filled in with panels of "wattle-and-daub," that is, coarse wicker work plastered with clay. The windows are square, and quite small.

Within, there is a central hearth of stones, with a hole in the roof to let the smoke escape. There is no chimney. Shelves against the wall and strings from the beams support the cooking and table utensils—well-shaped and neatly decorated pottery vessels of assorted shapes and sizes. The man's weapons—bow and stone-tipped arrows, spear and stone war ax—lean against one of the wooden supporting posts.

In a second room to the rear are stored supplies and a stone handmill for grinding the grain.

The second house, dated about the beginning of the Christian era, shows a considerable advance over the earlier type, yet reveals also its evolutionary connection with it. It is still rectangular with a straw-thatched, steep-pitched roof, but it is larger and is built entirely of logs. Indeed, it resembles rather strongly the log cabins of pioneer America. It is surrounded by a fence with posts set firmly in the ground and woven together with a lattice of stout branches.

Within, the arrangements and furnishings show vividly the advantages gained by the introduction of iron tools. The inner sides of the logs are squared off, and the supporting posts are also squared. There are benches and a table of good smooth boards, not only well fitted but artistically carved.

The central open fireplace still lacks a chimney, although there is a kind of flue supported on the rafters, that helps to lead the smoke toward the smokehole in the roof. Over the fire a big bronze kettle is suspended on iron chains.

The same building was occupied by both the family and their farm animals, as many of the older farmhouses in Europe are to-day. In those earlier times, this was necessary for the protection of livestock from wild beasts and human foes. The central hearth provides the separating zone; at one end the stalls, at the other the living quarters for the family. In the more recent farmhouses, as in Lower Saxony, walls separate living quarters from stable, but in this ancient dwelling the busy housewife tending her fire could keep an eye on how things were going throughout the establishment.

In the living quarters the shelves and other furniture are more numerous than in the Neolithic house, but most of the table and kitchen ware (with the exception of the

big bronze kettle) are still of pottery and much the same in pattern as those of 2000 years earlier—as indeed a great deal of pottery is to-day. A notable feature is a stone quern or hand-mill for grinding grain.

—FRANK THONE.

THE RUSSIAN NORTH POLE EXPEDITION

THE following description of daily routine at the North Pole Station by Ernst Krenkel, radio operator, was received via radio to Moscow, and with the cooperation of Tass, the Soviet Telegraphic Agency.

Different hours have been fixed for every one of us for scientific observations and work during the twenty-four hours of the day. We therefore sleep at different hours. We come together only at dinner time, about three o'clock in the afternoon. I am the permanent night watchman from midnight to six o'clock in the morning. At ten minutes to six I wake Fedorov to get up for his first morning meteorological observations. He soon starts drafting his routine weather reports, kneeling before his instruments. At 6:15 A.M. Rudolf Island demands a weather report. The switches of the radio transmitter click as usual and it hums evenly.

Meanwhile Fedorov has already boiled tea. We drink tea in the living tent, otherwise the frost makes the butter, caviar and cheese inedible. Sometimes the morning tea is interrupted to check the chronometers or by a sudden appearance of the sun, which demands immediate astronomical observations. After breakfast Fedorov retires to his ice "study" or remains in the tent and plunges into his note-books, reference books and charts and becomes absorbed in calculations. About 9 A.M. Papanin and Shirshov get up. Fuel, stores, lamps and all other details in the life of the camp form the scope of Papanin's untiring activities.

Shirshov spends whole days in his tent over the ice-hole. All smeared with grease, with hands blue from contact with the ice-cold water, he is accumulating most interesting material.

It is very hard to warm up frozen porridge and soup so that nothing is burned. Two principal demands are made of food: hotter and with the least expenditure of kerosene. After dinner we have an hour's rest and then we continue our work. It is very cozy in our place at our evening meal, at about 10 P.M. Fedorov is already asleep and only three of us drink tea. The principal subjects of our conversation are Spain, China, Moscow. Every one has a radio head-phone on. At 11:30 P.M. we regularly hear Moscow's loud and distinct broadcasts.

I go out to make my meteorological observations. Under a clear sky the cold is particularly felt. The horizon is covered with a frost haze, there is no wind—which means that the night duty will be quiet and the question, "How is the wind?" won't resound from Papanin's sleeping bag. Every hour I inspect the camp, I guess in the darkness the familiar heaps of ice-blocks. The antenna hangs like a thick rope covered with the extraordinarily thick layer of rime. There is a tinkling stillness around, now and again one hears ice cracking somewhere. It seems as if everything is frozen. But the ether roars with music for all tastes, and the revolving meter lowered into the water will evidently again show, at five o'clock in the morning, a considerable drift of our ice floe to the south, despite the absence of wind.

THE UNSEALING OF THE ORIGINAL BELL PHONOGRAPH

A VOICE sounded across fifty-six years when the first successful phonograph ever built, silent for more than half a century, was played at the Smithsonian Institution. Deposited in a sealed box in the vaults of the institution in 1881, the phonograph was brought out into the light of day and a record deposited with it was reproduced through a modern loudspeaker.

Descendants of Alexander Graham Bell, co-inventor, looked on as the grandfather of all sound recording devices now in commercial use was lifted out of the box in which it had rested through the years. Though difficult to understand at first, the voice on that aged wax cylinder, "There are more things in heaven and earth, Horatio, than are dreamed of," resounded clearly through the Regents Room of the institution.

Bell and the two co-inventors, Chichester Bell and Charles Sumner Tainter, had placed the "graphophone," as they called it, and other apparatus in three sealed boxes with the institution in anticipation of a court battle over priority in the invention of the phonograph. They left instructions that it was not to be opened unless instructions were given by two of the three inventors. Both Bells are dead now, but 84-year-old Tainter, an invalid at San Diego, Calif., ordered the institution to open the boxes. The ceremony was once postponed because permission had not been obtained from all of Bell's descendants.

Sealed in a metal-covered wooden case half the size of an orange crate, the "graphophone" was packed in with a rubber speaking tube for making records and the electrotype matrix for an early phonograph record. But the rubber tube had long since hardened and the copper plate long since turned green with age. Two other boxes, containing a model of the "photophone," the first device ever to transmit the human voice without wires and based on the same principle as the talking picture to-day, were opened at the same time. The photophone made use of one of the earliest "electric eyes" to convert a beam of light, controlled by the speaker's voice, back into sound again. The speaking tube with it, too, was stiff with years.

Mrs. David Fairchild and Mrs. Gilbert Grosvenor, both daughters of inventor Alexander Graham Bell, who is noted for the invention of the telephone, were with Dr. C. G. Abbot, director of the Smithsonian Institution, and T. H. Beard, research director of the Dictaphone Company, when Mr. Beard set to work on the case containing the "graphophone" with a screw driver. A few minutes of work and the machine was in full view.

A phonograph recording machine was patented by Thomas A. Edison four years before, but it was not commercially successful. It used tin foil wrapped around a cylinder instead of the wax cylinder devised by the Bells and Tainter. The tinfoil cylinder has passed completely out of use, while the wax cylinder is still used for office

dictation machines, discs made of wax and other materials for phonographs.—LEONARD H. ENGEL.

A NEW TREATMENT FOR CANCER

DRS. TEMPLE FAY and George C. Henny reported to the Chicago meeting of the American College of Surgeons that "refrigeration" of the body to a state of "semi-hibernation" is the new method of cancer treatment now being tried at Temple University School of Medicine.

The "refrigerating" is done by special cooling devices applied to cancer areas, or by x-ray treatment of pituitary, thyroid and sex glands. The latter method reduces the entire body temperature. The object of the refrigeration is to induce a temperature unfavorable for the growth of young cancer cells, which apparently require the high temperatures found in the mouth and internal organs. In cases in which the method was used to lower the temperature of the area of cancer growth, there was "definite retardation in the growth and decrease in its size in some instances."

The x-ray "refrigeration" method is used in cancer cases where the tumor cells are wide-spread throughout the body. Reporting on this method, the doctors stated: "In one instance, the tumor cells in the brain, spine and bones of the body disappeared and have shown no signs of return, during the past nine months. In two others, definite improvement has been noted in the size of the tumor masses."

The cases had all been given up as hopeless after all regular methods of treatment had failed. Whether the improvement will be permanent can not be stated at present, but the method is of importance because of the new approach to the cancer problem which it gives. Important also is the fact that pain was promptly relieved following "refrigeration" of the area of cancer involvement. This alone helped to maintain the patient's strength and morale without the need of narcotics. Research which led to this new method of treating cancer was financed by the International Cancer Research Foundation.

ITEMS

AN increase in deaths from tuberculosis as a late result of the economic depression is reported by Dr. Kendall Emerson, managing director of the National Tuberculosis Association. His report is based on figures submitted by the state boards of health. In 1936 there were 70,907 deaths from tuberculosis in the United States exclusive of New Hampshire for which figures are still unavailable. In 1935 the total tuberculosis deaths for the country (including New Hampshire) were 69,471. The 1936 increase was anticipated by tuberculosis workers throughout the country, and came after a ten-year period of decreasing annual tuberculosis death rates.

A LOWER death rate for the entire nation during the first half of 1937 than during the corresponding period of 1936 is reported by the U. S. Public Health Service. Not even an influenza epidemic during the first three months of this year could check the falling death rate, although the death rate would have been even lower if it had not been for that epidemic. The death rate for the second quarter of the year was lower than it had been at that period for the past three years. Cancer was the only disease among the important causes of death that showed a rise. Particularly gratifying is the decrease in maternal deaths. The maternal mortality was 13 per cent. less than that for the corresponding period last year. Tuberculosis mortality was lower for the first 6 months of the year than for the same period in any of the 3 preceding years. The birth rate and the infant mortality rate showed no change from the 1936 rate.

OIL is being recovered from Pennsylvania wells that have ceased producing profitably under other methods of working by a new water-flooding process developed by workers at the Pennsylvania State College. Water under pressure is forced into oil-bearing rock formations through selected wells to sweep the oil out through other wells, in the new method of "reviving" non-producing bores. Six experts, including Dr. Kurt H. Andresen, Dr. Thomas S. Cooke and H. B. Charmbury, have been working successfully on standardization of the method for four years. Increasing attention has been paid by petroleum engineers the world over to the job of extracting the last remnants of oil from a pool as increasing numbers of fields give out. Blasting, to break up rock formations clogging the bottoms of wells, has been successfully developed in this country, while Russian engineers have used compressed air to achieve the same result.

ELEVEN of the twelve cosmic ray recorders released on balloons this summer by Dr. Robert A. Millikan and Dr. H. Victor Neher, of the California Institute of Technology, have been returned to the institute. The eleventh was found by a Canadian farmer on September 26 while he was looking for horses. The instrument was found dangling from a tree. The still missing balloon is somewhere in Canada. Four recording electroscopes were sent aloft by means of balloons from Saskatchewan Province in Canada and eight from Omaha, Nebr. All eight of the balloons sent up from Omaha have already been returned. The highest altitude achieved was between 83,000 and 84,000 feet, a height gained by one of the Omaha balloons. Canadian records that have been developed show the maximum altitude reached to be from 73,000 to 74,000 feet. The eight instruments released in Nebraska were recovered within 90 miles of Omaha, while the instruments sent up in Canada drifted as far as 180 miles from the starting point.

ANOTHER clue to the riddle of how plants, ultimately responsible for the world's food supply, for only plants can manufacture food from simple substances, combine carbon dioxide and water to form sugar, has been reported by Dr. E. D. McAlister, of the Smithsonian Institution. Chlorophyll, the green coloring matter of leaves and also the magic chemical which enables plants to manufacture food, acts as a single molecule at a time and not in large groups. "Looking inside" a plant by means of his new spectrophotometer, which he invented recently, while the plant was "waking up" after being left in the dark for varying periods has enabled him to reach this conclusion.