SCIENCE NEWS

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THE MEETING OF THE ROYAL SOCIETY OF CANADA

AT the Toronto meeting of the Royal Society of Canada, Drs. W. R. Franks and H. J. Creech, of the Banting Institute, reported experimental work in vaccination against cancer. Protection has not been tried in the case of man and will not be until results of animal tests now under way show whether or not the material made in the Banting laboratories is a cancer vaccine. Various proteins have been combined with cancer-producing chemicals such as certain anthracene or coal tar derivatives. This material was injected into rabbits, guinea-pigs and rats. After the injections, the blood of these animals contained antibodies which united with cancer-producing chemicals. Dr. Franks said: "We do not yet know whether the union between the antibody produced in animals and the cancer-producing chemicals checks the power of the latter to cause cancer."

W. H. JOHNSON, of the University of Toronto, told how water fleas, minute marine shrimps, react to light. It is an important practical problem. Young herring, or sardines, feast on water fleas and whether or not sardine cans are to be filled depends upon whether they have plenty to eat. The water fleas go up and down in the water with changing sunlight and moonlight. Why? Moths fly into candles and fish come to the surface when a bright light is flashed. So also water fleas move toward the light when they first come out of the darkness. But Mr. Johnson found that once in the light they may become indifferent, or they may press towards it when it weakens, as if they dreaded losing it, or they may retreat from it when it becomes more intense as if they were afraid of it.

THERE is a chance that practical weed control under field conditions may be achieved by use of relatively small doses of plant poisons, according to a report by Dr. W. H. Cook, of the National Research Council of Canada. Unwanted plants are often reduced to half their usual size by a chemical dose only one tenth that required to kill them.

So alike are the finger and palm prints of so-called "identical" twins that Dr. John W. MacArthur, geneticist at the University of Toronto, reported that this type of twinning can be correctly diagnosed four times out of five from finger and palm prints alone without comparing faces. Using a new method devised by Professor MacArthur, left and right hands of the same person average about 27 per cent. unlike in twins as well as single born. Matching left hand with left and right with right, pairs of identical twins differ by only 19 per cent. in their patterns, lines and ridges. Ordinary brothers and sisters and fraternal twins average twice as unlike or 38 per cent.

LEIF ERICKSON, John Cabot, La Salle, Henry Hudson, Mackenzie and other discoverers of Canada passed in review when Lawrence J. Burpee made an animated cartoon of Canada's history, done in the mode of Mickey Mouse, part of his presidential address. The importance of Canadian waterways in its discovery and exploration was emphasized by Mr. Burpee. It has been repeatedly proved in practice, he said, that a man might travel in a canoe, with nothing more than an occasional portage, from such a central reservoir as Lake Winnipeg, east to the Atlantic, west to the Pacific, north to the Arctic, northeast to Hudson Bay or south to the Gulf of Mexico.

DR. D. C. ROSE, of the National Research Council of Canada, reported that only thunderheads, technically known as clouds of the cumulo-nimbus type, contain localized electric charges. Airplane flights among the clouds during which delicate potential gradient and conductivity measurements were made furnished this proof of the non-electrical character of ordinary clouds.

DRS. C. D. NIVEN and J. D. Babbitt, of the National Research Council of Canada, spoke of researches on how fabrics transmit heat. They covered a small heated cylinder, representing a person, with underwear, shirting and lined tweed suiting. Then they measured the heat losses in still air and drafts. In absolutely still air the naked cylinder was not protected from heat loss as much relatively as it was in a wind blowing 500 feet per minute. The dressed cylinder in still air lost two thirds the amount of heat which it did when uncovered, but in the wind only a third. The experiments showed the great importance of the air space between clothing and the skin. The apparatus indicates that shirting held away from the cylinder about a quarter of an inch is almost twice as effective in stopping heat loss as shirting close to the cylinder and in the wind of 500 feet per minute about three times as effective. A fabric—either thick tweed or thin cotton shirting—held away from the cylinder about a quarter of an inch allows only about a fourth of the amount of heat to escape in the test wind that the bare cylinder loses, thus confirming the well-known fact that in a breeze there is a considerable difference between wearing the thinnest of cotton shirts and being "stripped to the waist."

TEMPERATURE OF THE SUN'S ATMOSPHERE

AN unexpectedly large temperature drop of 1,500 degrees Centigrade between the surface of the sun and its overlying atmosphere has been found by astronomers at Harvard University.

Perfection of a comparatively new technique of measuring the heat of the gaseous envelope of the sun, one that employs delicate spectrum analysis, enabled the discovery. With it, the astronomers have calculated the temperature of the sun's atmosphere to be about 4,500 degrees Centigrade. Previous measurements of the heat at the sun's surface have given a figure of 6,000 degrees Centigrade, which, with the new figure for the temperature of the envelope, indicates a falling off of 1,500

degrees. A small temperature drop had been expected, but the large decrease in heat between the sun's surface and its outer atmosphere as shown in the new measurements was not expected.

The research was conducted by Professor Donald H. Menzel, Leo Goldberg, Bemis fellow of the Harvard Observatory, and James G. Baker, a graduate student in astronomy. In the project the black lines found across the ordinary solar spectrum were used. These lines are formed as the sun's light passes through the solar gas envelope with each atom in this atmosphere absorbing its own characteristic colors from the sunlight. The result consists of periodic dark shadows across the familiar rainbow band. Inasmuch as the intensities of these shadows or lines depend to a large degree on the relative heat of the light source, they can be used as a "thermometer" or guide to the temperature of the source.

This relatively new type of research was begun several years ago when Mr. Goldberg undertook calculations of the theoretical intensities of related lines in the spectra of various elements. Dr. Menzel extended this quantitative theory of line formation and more recently applied the research as a key to solar temperatures.

A NEW HIGH-VOLTAGE ELECTROSTATIC GENERATOR

SHOWERS of electrically charged man-made raindrops are the basic factor in the newest high-voltage electrostatic generator just patented by Clarence W. Hansell, of Port Jefferson, N. Y. In this respect the high voltage is obtained in quite the same way—but under controlled conditions of course—in which nature builds up the voltage of enormous potential seen in lightning. The Radio Corporation of America has been assigned the patent rights to the invention. The equipment is designed either for experimental research in bombarding the atom's nucleus or, more practically, as the source of potential on super x-ray tubes for treating malignant diseases, like cancer.

The "rain" consists of a spray of some semi-conducting liquid like water which falls through an intense electric field. Electrical charges are thus carried to the "ground" below, which is a container attached to the generator of high voltage. The little electrical charges on the raindrops are conducted off to the great storage spheres which can serve as the ends of the auxiliary accelerating apparatus.

The important feature of the new invention is its extreme simplicity and absence of moving parts. Most of the electrostatic generators to-day, including the giant of them all at the laboratories of Professor Robert Van de Graaff, of the Massachusetts Institute of Technology, use silk or paper belts to carry up to the storage spheres the small charges of electricity which ultimately attain a potential of as much as 5,000,000 volts. In the Hansell patented generator the falling "raindrops" replace the belts; belts which have caused much annoyance because of their relatively short-lived wearing characteristics.

MOLDED PLASTIC LENSES

SPECTACLE lenses produced at a rate of 1,500 an hour instead of being ground slowly and laboriously by hand, are only one possibility of the new transparent resin molded lenses now being exhibited in America by two British inventors. Eye glasses for all who need them at a cost measurable in cents instead of tens or twenties of dollars may some day be the result of thus achieving a long-held dream of molding optical lenses instead of fashioning them tediously by hand. Good quality lenses on low price cameras and binoculars are another possibility already realized on a small scale.

In America, in England and in other countries plastics of remarkable water-clear transparency have been achieved. Now from England come lenses of a transparent plastic known abroad as Perspex. And from it are molded lenses accurate enough for almost any use except in the finest of optical instruments. Particularly to the point, the accuracy of the lenses is more than sufficient for spectacles.

The transparent resins have one natural disadvantage compared with glass for the production of lenses. They scratch relatively easily and probably have nowhere near the lasting qualities of glass. The molded lenses rest on two things: the new transparent plastics and the new molding process for fashioning them accurately into a lens surface. It is the second factor which is credited to the two co-inventors from Great Britain: Arthur W. Kingston, research engineer, and Peter Koch de Gooreynd, Anglo-Belgian industrialist. In recent months of the five-year development program Dr. W. E. Williams, of the Wheatstone Laboratory, King's College, University of London, has acted as consultant.

The accuracy of molding in the new plastic lenses is reported to be 1/500,000th of an inch, by independent and reputable measurement. This is sufficient for any but the finest and most expensive of optical instruments. In fact, it is much better than the accuracy required for spectacle lenses, which is 1/500,000th of an inch.

F. Twyman, managing director of the house of Adam Hilger, Ltd., in a report on the new lenses, said that "The lenses submitted to me are satisfactory for the cheap class of work for which they are intended. Further, I am of the opinion as a result of the tests made, that with care in preparation of the material and molding, lenses could be produced of a quality good enough even for such work as good camera lenses, binocular lenses and so forth. The only defects of the material for such work as mentioned above are the obvious ones that it is not so hard as glass, and is thus more easily scratched and that it becomes plastic at temperatures much above normal, being easily molded at 100 degrees centigrade."

The chemical name of the British resin employed in the lenses is methyl-methacrylate. There are equivalent resins known by different trade names, produced by the du Pont Company of America and other countries. The molding process is controlled by the Combined Optical Industries, Ltd.—ROBERT D. POTTER.

THE SOVIET POLAR EXPEDITION

WHEN Professor Otto Schmidt set his plane-borne expedition down on "the top of the world," he was only placing the keystone in an arch of conquest of the Arctic by Russia that has been going on practically since the Revolution.

The first effort was in the direction of navigation of the vast Siberian coast—the Northeast Passage dreamed of since Columbus and Magellan, but never achieved as a commercial possibility. Navigation in turn demanded more exact knowledge of the coasts and waters, and the weather that ruled over the region. So the scientific authorities of the USSR brought about the establishment of some 60 Arctic stations along the coast and on offshore islands. At each of these stations are investigators who study air and ocean conditions, a radio operator and one or more airplanes.

The data are relayed to Moscow for compilation and interpretation through the key radio station on Dickinson Island. When ships come, with a giant icebreaker leading when necessary, the planes go up, spy out the open lanes or the weak places in the ice, and radio navigational information to the ships' commanders. Life at one of these stations is more or less like what it will be for the four Russians who are undertaking a year's residence at the Pole. The houses, however, are very solidly built of timber and are more commodious than the lightweight movable shelter.

At some of these threescore Arctic stations vegetables are grown under artificial light in fur-lined cellars, with current generated by windmill power overhead. No one pretends that they are economically produced, but the workers must have vitamins and some salad. These investigators have been gathering meteorological information that should prove to be of great usefulness in the new program of the study of the weather by air-mass analysis. To the fruits of their labors will now be added data from the Pole itself, which should help meteorologists not only in Russia but all over the earth.

BROADCASTS OF THE ECLIPSE

DESCRIPTION of the longest solar eclipse in more than 1,200 years, which occurs on June 8, lasting over seven minutes at the point of maximum duration, is being brought to America in broadcasts by the two major broadcasting companies. Because it occurs in distant isolated places, programs prior to the great astronomical event have also been given. Those from the eclipse headquarters of the scientific expeditions describe life in these out-of-the-way places in the South Seas and Peru, while programs originating in America are given for the benefit of members of the expedition. The remaining programs follow:

June 7, 6:45 P.M., E.S.T.—Description of last-minute preparations from Canton Island. (NBC—Blue Network.)

June 7, 5: 00 P.M., E.S.T.—Preview of last-minute technical preparations. (Peru, CBS.)

June 8, 12: 00 M., E.S.T.—Early stages of eclipse from Canton Island. (NBC—Blue Network.)

June 8, 5: 00 P.M., E.S.T.—Description of eclipse. (Peru, CBS.)

June 8, 2: 00 P.M., E.S.T.—Totality described from Canton Island. (NBC—Blue Network.)

June 8, 9: 45 P.M., E.S.T.—Scientists at Canton Island will speak of results of observations. (NBC—Red Network.)

ITEMS

MUCH of the light from the familiar red star Betelgeuse, in the constellation of Orion, comes from its depths, not its surface. Dr. Walter S. Adams, director of the Mount Wilson Observatory in California, discovered new features of the star's spectrum photographed with a powerful spectrograph attached to the Mount Wilson 100-inch telescope. Dark lines of the spectrum appeared to be doubled, due to a narrow bright line in the middle of those dark spaces caused by light absorption in the star's atmosphere. This reversal showed that much of the star's light came from great depths within it. The density of the giant red star is only about a thousandth part that of air. This previously established fact is supported by the new researches.

Two thousand feet of 35 mm motion pictures have been taken at the Mount Wilson Observatory in the study of explosions on the sun and the effect of these eruptions upon short-wave radio broadcasts. Dr. R. S. Richardson, of Mount Wilson, has secured considerable evidence to indicate that a strong relation exists between the eruption and radio fadeouts. The motion picture camera is started soon after sunrise and operates continuously with very little attention until shut off an hour before sunset. As a result, a nearly complete record of the appearance of the sun has been obtained since May, 1936. In discussing fifteen eruptions, Dr. Richardson reported that in five cases the time the eruption was first seen agrees to a minute or less with the time when the radio fadeout began. Solar observations were made shortly before the fadeout occurred, the longest interval being eleven minutes. Six of the eruptions apparently preceded the fade-out by from two to twelve minutes. For the four remaining fade-outs, the observations were made from ten to thirty minutes after the radio disturbance began.

A NEW machine that may play a great part in the battle against soil erosion is described in a patent recently granted to Edgar V. Collins, Ames, Iowa. The patent has been assigned to the Iowa State College Alumni Association, Inc. It is claimed that the machine will throw up in the rough 10 miles of erosion-checking terraces in one hour. The usual method of checking soil erosion on sloping ground is to build up parallel rows of terraces that block the rush of water down the slope, trapping it so that it will be absorbed in the soil where it will do most good. At present, plows, scrapers and grading machines are used. But these machines do not work efficiently under adverse soil conditions, and are expensive to operate. Mr. Collins's machine, an injenious combination of plow and dirt thrower, on the other hand, is simple and speedy, and will work anywhere that a plow will work. It is powered by a shaft from the tractor that pulls it. The plowshare cuts a furrow and feeds the soil to a dirt thrower which consists of rapidly revolving screw-like blades. The spinning blades hurl the soil up and out 15 feet or more and pile it neatly in a ridge. A standard automobile gear shift controls the revolving speed of the blades to throw the soil to any desired distance.