

## SCIENCE NEWS

*Science Service, Washington, D. C.***A NEW PLAN FOR THE PRODUCTION AND TRANSMISSION OF ELECTRICAL POWER**

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ELECTRICITY generated by enormous disks spinning in vacuum and "piped" unlimited distances along vacuum-surrounded rods, carrying cheap energy from great water power developments or coal and oil fields to the centers of population, is the possibility held out by Dr. Karl T. Compton, chairman of the Science Advisory Board, in a research project recommended to President Roosevelt for federal financing.

This revolution in both the making and the transporting of electricity has been in the making for the last five years. Young Dr. Robert J. Van de Graaff is the scientist mainly responsible. The 10,000,000-volt electrostatic generator built by the Massachusetts Institute of Technology at Round Hill, Mass., is the first step toward an electrostatic generator suitable for commercial power production. The transmission system proposed, an airless pipe with a rod running through it, has probably been tested but no experimental results have been announced.

Dr. Compton in a description originally prepared over a year ago and just made available as a part of the Science Advisory Board report proposed "a radically new scheme for electric power transmission" because present methods of transmitting electrical power are limited by practical reasons of efficiency, complexity and cost to about 250 miles. The new system should be "cheaper to install than the present systems and should be capable of transmitting power to unlimited distances without appreciable loss."

It is known that there is some hope that the Tennessee Valley Authority with its large power developments may benefit from this radically new development. Several hundred thousands of dollars would finance a serious effort to develop the new scheme to the stage of useful application. The project is described as "planned and ready to start under competent supervision on short notice."

Instead of alternating current that the now-standard electromagnetic generators produce at high voltage, the new proposed generators would give out direct current at about a million volts.

The giant disks of the electrostatic machines would be surrounded by vacuum because of the necessity of preventing tremendous sparks that might wreck the whole equipment if they were allowed to occur. The great progress that physicists have made in recent years in producing high vacuum in large spaces will contribute materially to the success of the new scheme.

If this new power production dream is realized, it will be a case of progress turning the clock back, in a sense. For the electrical machines that were used in the eighteenth-century by Benjamin Franklin and others were of the electrostatic type. They generated electricity by

friction on large disks. All modern electrical generators and motors employ the principle of electromagnetics instead of electrostatics.

In the experiments with the ten-million-volt electrostatic generator already built, the accent has been upon its usefulness for producing artificial lightning to smash atoms and conduct research in physics. The commercial application of the scheme has been an objective about which there has been little discussion and still less definite announcements.

**FOG DISSIPATION**

A REPORT on a chemical method of fog dissipation by water-absorbing material, a project sponsored by the American Philosophical Society, was made to that body, meeting in Philadelphia, by Professor Edward L. Bowles and Henry G. Houghton, Jr., both of the Massachusetts Institute of Technology.

Recently at Round Hill, South Dartmouth, Mass., Professor Bowles and Mr. Houghton successfully completed their first tests when, by spraying a saturated solution of calcium chloride through specially designed nozzles, they cleared a sizable path through a pea-soup fog. Professor Bowles described the general program of research at Round Hill, with emphasis on the experiments with fog. Mr. Houghton discussed the specific problem of dissipation.

The individual fog particles were found to range in size from two twenty-five hundredths to one twenty-five thousandths of an inch in diameter, the smallest being only slightly greater in diameter than the wave-length of red light. The size of the smallest of these particles is indicated by the fact that 25,000 of the droplets could be placed end to end within the space of one inch.

Measurements and photographs of the particles by microscopes were made by Mr. Houghton and Dr. Julius A. Stratton, who with Mr. Houghton did much of the work preliminary to the dissipation project. Natural fog was allowed to drift across a flat glass slide on which the microscope was focussed while an extremely thin coating of grease on the slide caught individual particles and prevented the droplets from spreading. Fine lines were ruled upon this glass slide for measurement.

Fog is composed of particles of various sizes with one size usually predominating, it was found. This predominating particle varies with different fogs. It was formerly believed that fog is composed of particles of discrete size.

It was also found that salt, invisible grains of which are tossed into the air from breaking waves, are the cause of most sea fogs. These fine particles are the nuclei on which the infinitesimal droplets of fog condense.

As his research advanced, Mr. Houghton said, he began experiments on the dissipation of fog by means of laboratory apparatus which included an artificial fog chamber with equipment for generating fog. In one of his earliest experiments, he found that a gram of cal-

cium chloride powder was capable of clearing about three cubic meters of specific fog air at 20 degrees Centigrade, proving the feasibility of attempting a large scale application. This experiment also solved the question of the mechanism of dissipation by showing it to be due to a lowering of the vapor pressure and not to a physical sweeping action, although after a time there may be some sweeping action by the falling drops.

No effort has been made, Mr. Houghton said, to determine the approximate cost of clearing a given area for a specified time. From his experiments, however, he is positive that it is well within the realm of practicability. In the actual test on an actual fog at Round Hill, a 100-foot pipe fitted with its special nozzles at frequent intervals was suspended horizontally 30 feet above the ground. A fog bank driven by a southwesterly wind at 13 miles an hour drifted in from Buzzard's Bay, limiting visibility to less than 500 feet.

When the fog had completely enveloped the region, pumps driving the chemical solution to the distributing system were started and a fine spray of calcium chloride solution began falling from the long pipe. Within a few seconds fog drifting through the chemical curtain began to precipitate, falling to the ground in the form of water drops.

Immediately a path of visibility 100 feet wide and 30 feet high began to open across the airport at Round Hill in a northwesterly direction. On either side were walls of turbulent white vapor, but in the cleared area the ground was entirely free of fog. Within a few minutes objects more than 2,000 feet away were clearly revealed. The path was clear as long as the chemical curtain was operated. It was several minutes after the pumps had stopped before the fog began to close in again.

#### IMMUNIZATION AGAINST INFANTILE PARALYSIS

WITHIN one week a group of New York City children had immunity to dread infantile paralysis as a result of small doses of infantile paralysis virus made harmless by formalin, according to a report made by Dr. Maurice Brodie of New York University and the New York City Health Department before the Chicago meeting of the Society of American Bacteriologists.

Before receiving the protective doses, almost all the children had in their blood a small amount of virus-neutralizing material. Three weeks later, the amount of this neutralizing material had increased to the point where the children's blood was capable of neutralizing from 100 to 600 additional infective doses of virus. Before giving the immunizing doses, the method was tried on six volunteers from the New York City Health Department Bureau of Laboratories. Neither these adults nor the children suffered any unfavorable results.

Grown persons develop immunity to infantile paralysis as a result of exposure to the disease, and not just as a result of growing up, as has been suggested. Evidence in favor of the theory that immunity results from exposure was presented by Dr. Brodie and Dr. William H. Park, director of the research laboratories of the New York City Health Department.

The blood of monkeys of different ages was tested for ability to neutralize the infantile paralysis virus. Neither old nor young monkeys possessed any neutralizing power. This seems to show that these animals, which have little or no opportunity for exposure to the virus, fail to develop immunity as they grow older. On the other hand, blood of 27 out of 34 adults who had probably been exposed to the virus showed considerable neutralizing power. Those with a history of frequent exposure to the virus showed slightly higher average neutralizing power than those who had no knowledge of contact with infantile paralysis.

#### THE ISOLATION OF NEW DISEASE-PRODUCING STREPTOCOCCI

A NEW member of that well-known and dangerous germ family, the streptococci, has been found in the throats of persons suffering from rheumatic infection and a type of kidney disease, according to a report made by Drs. Perrin H. Long and Eleanor A. Bliss, of the Johns Hopkins Medical School, to the Society of American Bacteriologists at Chicago.

The new streptococci are much smaller than their other relatives and have been given the name of minute beta hemolytic streptococci. But the frequency with which they inhabit throats of patients suffering from these two diseases suggests that they may be fully as harmful as the larger variety of streptococci. The larger streptococci have been thought to be the cause of both rheumatic infection, this particular kidney disease, and various other ills.

In two instances these minute streptococci were the sole cause of pus infections in humans. They were found in the throats of four-fifths of a group of patients suffering from the type of kidney disease known as glomerular nephritis and in the throats of half the patients suffering with rheumatic infection. They are rarely found in the throats of persons ill with chronic diseases or other acute infections. In well persons their number is only from one half to one third that of the ordinary beta hemolytic streptococci. But in the patients suffering from rheumatic infection and from the kidney disease these minute organisms greatly outnumbered the larger beta hemolytic streptococci, in many cases being the only hemolytic streptococci found.

Because of the well known association between the larger streptococci and both the kidney disease and rheumatic infection, Drs. Long and Bliss feel that their findings may be of considerable importance.

#### RECORDING OCEAN WAVES

A RECORDING current meter, which will keep a complete record of intensity and direction of ocean currents, and by which it is hoped to be able to forecast destructive waves, has been devised by Dr. George F. McEwen, professor of physical and dynamical oceanography at the Scripps Institution of Oceanography, La Jolla, Calif.

No instrument now in use keeps a time record of current changes, Dr. McEwen stated, in explaining his new machine, now in its experimental stage on the pier at the institution. The device, which operates on the principle of a pendulum, consists of a perforated sphere set on

gimbals free to move in two directions. The extent of the movement is recorded on a revolving waxed cylinder, according to Dr. McEwen. "From the movement thus recorded along two lines at right angles to each other we can easily compute the resultant line, which gives us direction and intensity of the current." He explained that the new instrument is designed to compile data on current movements for use in studying causes of the huge waves which have rocked the coast of Southern California and on occasions caused property damage.

Attached to the apparatus, which weighs 200 pounds in all, is a magnetic needle which automatically locks after becoming settled, so that the compass direction of the currents is known.

The disk on which the record is made is rotated by another cylinder filled with oil and containing a plunger. As the oil seeps by the plunger an attached weight slowly lowers, turns the disk, and locks the compass. Dr. McEwen anticipates constructing a similar device for measuring winds and air currents. While the present instrument is now recording currents near shore at La Jolla, he hopes soon to equip ships with similar ones.

According to Dr. McEwen, the giant waves in this region are caused by a combination of coastal oscillations and long sloping waves coming in from hundreds of miles out at sea. "We don't know much about these currents yet," he said, "but once we have these instruments stationed in key positions along the coast we shall be able, at least, to forecast disasters."

### ALPHA-DINITROPHENOL

DANGER may lie in wait for the person who tries to reduce by means of a simple method widely publicized during the last eighteen months.

Warning to doctors, press and public against the indiscriminate use of this drug, called alpha-dinitrophenol, is issued by the *Journal* of the American Medical Association in an editorial in the current issue. Three persons have died and many others are experiencing ill effects from the use of the new method of reducing. Some 100,000 persons in the United States have been treated with this drug in the past year, it is estimated, in the belief that here at last was a method of reducing excess weight which was free from serious after-effects. The drug burns the extra body fat and carbohydrate without affecting the protein, the medical journal says. However, reports of its toxic effects have already persuaded many doctors to stop its use until the results of further studies are known. Skin rashes are among the unpleasant and sometimes alarming after-effects of the use of the drug. It seems to have no bad effect on the liver or on the circulation, but investigators believe it needs careful watching as to possible injury to the red blood cells.

The drug can be purchased at any corner pharmacy, and the medical journal regrets the fact that no restrictions have been placed upon its sale. One of the big points in its favor when the use of the drug as a reducing method was first announced was the ease of its administration. The fat man or woman merely swallowed three capsules a day and within three months or so normal weight was achieved.

The editor of the medical journal urges that the sale of alpha-dinitrophenol be restricted to that ordered by doctors' prescription and that its use by medical men be carefully supervised. Probably it should be used by the physician, the journal states, only when reduction of weight is important for health and when ordinary dietary methods have failed.

### ITEMS

THE following forecast of this winter's temperature has just been received by Dr. Charles F. Brooks, director of the Blue Hill Observatory, Harvard University, from Dr. Franz Baur, director of the governmental long-range forecasting bureau of Germany, at Frankfurt-am-Main: "The past and present world weather conditions permit us to expect, with ninety per cent. probability, that the winter of 1934-35 in the northeastern part of the United States of America (New York and New England) will be mild; that is, that the mean temperature of the winter months December, January and February will lie more than one half degree Fahrenheit above the average of the last sixty years."

THICKNESS of the Antarctic ice crust that blankets the world's southernmost land is being successfully detected by seismic soundings says a radio report from Little America from the Byrd Antarctic Expedition to the National Research Council. Thomas C. Poulter, professor of physics at Iowa Wesleyan College and senior scientist of the expedition, reports good results with the scientific work in the Antarctic, and says, "we will soon be starting back in possession of most of the data we set out to get." Unforeseen difficulties caused a few scientific projects to be abandoned, says the dispatch, but others have assumed much greater proportions than was anticipated. Regarding thickness of the ice, a point of great scientific interest, Professor Poulter radios: "I am pleased to report that the seismic soundings are coming along nicely, and that we have to date about three hundred fifty soundings distributed over eighty stations. The method is proving very satisfactory and giving the ice thickness, whether it is floated or grounded, and if floating, the thickness of the water layer, as well as something of the stratification of the underlying rock."

BREEDING experiments conducted at the Munich Zoological Garden have succeeded in producing a young horse resembling in every respect one of the two extinct horse species that roamed Germany when the country was still a wilderness. The Munich animal is a cross between the still-existing brown wild horse of the Siberian steppes and a descendant of the gray "tarpan" of southern Russia, extinct in its pure line since 1879. In both juvenile and adult coat colors and markings the "re-built" wild horse is said to be an exact counterpart of its vanished forebears. Success is also announced in "rebuilding" the aurochs, a species of wild cattle abundant in Europe during ancient and medieval times, but extinct since the seventeenth century. The results of these breeding experiments are discussed by Dr. H. W. Frickhinger, of Berlin, in *Die Umschau*.