SCIENCE NEWS

THE GERM OF "FOOT-AND-MOUTH" DISEASE

Science Service

ANNOUNCEMENT of the discovery of the germ of foot-and-mouth disease, with the forecast of the probable elaboration of a preventive serum, has been made by Dr. Heinrich Frosch and Professor Robert Dahmen, of the Berlin Veterinary Research Institute. While they have not yet made public their methods in detail, they announce that they obtained the germs from the liquid which fills the pustules which form on the feet and about the mouth of infected animals.

They propagated these germs on solid media after the usual bacteriological methods and with the thirteenth and twenty-third generations of culture were able to produce the disease in guinea-pigs. From the sixth sub-culture of another strain, a cow was inoculated and showed symptoms of the disease after eight days. Another cow, inoculated from the first one, developed a typical case.

The bacilli are too small to be seen with the highest power microscope, but by photography with light waves of short wave length they are revealed as rods about one ten thousandth of a millimeter in length, a millimeter being approximately one twenty-fifth of an inch. These tiny bacilli clot together to form globules about the size of the red corpuscles of the blood and which can easily be seen with the microscope.

The State Hygienic Institute and the Robert Koch Institute are now endeavoring to duplicate the results of Drs. Frosch and Dahmen. If they are confirmed an effort will be made to find a protective serum against this disease, which in the past few months has caused millions of dollars loss to farmers, dairymen and stock raisers in California and in England. Outbreaks in widely separated parts of the world are of not infrequent occurrence, and the disease is controlled only by the severest quarantine measures, no means of prevention or cure being known.

QUICK-GROWING CORN

Science Service

CORN with stalks so short that the ears appear to grow directly out of the ground and maturing in 70 days is now being grown at experiment stations under the direction of the U. S. Department of Agriculture. In an effort to produce corn of short growing season and high resistance to cold, this corn will be bred with new varieties discovered in the Andean highlands of South America by Fred D. Ritchey, of the Bureau of Cereal Investigations, who has just returned to Washington. This South American corn matures in a climate 20 degrees colder than that of the "corn belt."

"Corn with such short stalks is now being grown that the northern farmer may before long be harvesting his corn crop with a potato digger," said Dr. E. D. Ball, director of scientific work of the Department of Agriculture to a Science Service reporter. "Last summer I saw at the experiment station at Akron, Colorado, corn with stalks less than two feet tall when mature. The ears were so close to the ground that after hilling up they were nearly completely buried and appeared as if they were sprouting up through the ground directly from the roots. This corn matured in about 70 days."

These short-season corns are not the result of cross-breeding by department experts but are discoveries of varieties which have been grown in isolated sections in the northern parts of the continent. One of them has a rather eventful history. It was brought to Manitoba by Ruthenian immigrants a number of years ago from their native country on the slopes of the Carpathian mountains where the season is short. They have cultivated it in their colony 250 miles northwest of Winnipeg for years and have evolved a distinct variety. Others of even shorter season have been found in New Brunswick, Nova Scotia and other northern sections.

In Bolivia and Peru, Mr. Ritchey found corn maturing in spite of the fact that the average temperature for the year was 50 degrees Fahrenheit, while the average minimum temperature during the growing season was as low as 39 degrees. In our corn belt, an average night minimum of 55 degrees is considered the limit for commercial production and the average temperature during the growing season is about 72 degrees.

Few varieties of corn raised commercially in this country mature in less than 120 days, although some can be grown in 90. In the South, 150 to 180 days is the rule. It is the hope of the department through the crossing of these South American varieties with those from the far north to obtain a short-season corn, highly resistant to low temperatures. If the results are successful the product will probably be a dwarf variety, and the potato digger may come in handy when harvest time comes.

A SUPERPOWER ELECTRICAL MACHINE

A NOVEL electrical machine which is expected to revolutionize transmission of electrical power is being exhibited for the first time at the British Empire Exposition at Wembley.

It is a "transverter," a piece of apparatus that performs the function of both transformer and rotary converter and changes ordinary low pressure alternating current into high pressure direct current.

It is expected that the realization of the vast superpower project of the United States will be hastened by this invention, since it will make easier the interconnection of various power lines and sources.

Electrical engineers have long desired to use high-voltage direct current on transmission lines in place of high-voltage alternating current which is standard to-day. The economical transmission of electrical energy over long distances requires the use of high voltages, and the higher the voltages the greater the range of economical transmission. It has not been economical, however, to

make generators for voltages higher than 6,000 to 10,000 volts. In practice this pulsating current of relatively low voltage is put through transformers and boosted to the higher voltages, often 33,000, 66,000, 150,000, and even higher, necessary for transmission over any long distances.

But the successful operation of high-voltage alternating current transmission systems requires high technical skill. The switching off or on loads is likely to cause surges in voltage which often damage the line. Very heavy insulation is required as a result. Due to the fact that new generators feeding into a line must make their current match the current of the line exactly, in phase and frequency, the electrical characteristics of present day transmission lines must be carefully controlled. In addition the utilization apparatus must be carefully controlled to prevent excessive power loss through heating of the wires.

Direct current at high voltage is admitted to be practically ideal for transmission purposes, avoiding practically all troubles encountered in alternating current lines, but it has not been used due to the lack in the past of a device that will transform and convert a. c. into d. c., as the new transverter does.

The new transverter is the invention of W. E. Highfield and J. E. Calverey, engineers in the research laboratory of the English Electric Company. Since 1918 tests leading to the perfection of the new machine have been made secretly at the Preston plant of that company. Exhibition at Wembley of a transverter of 2,000 kilowatt output that delivers 20 amperes at 100,000 volt direct current was the first intimation of success of the research. A sister machine to the one exhibited takes direct current off the transmission line at high voltage and drops it down to low voltage alternating current that will supply industrial motors and lights.

Only the brushes on the transverter rotate, thus avoiding many of the troubles of other electrical machines. The transverter utilizes the fact that the rotating magnetic flux caused by a three-phase alternating current flowing through a stationary winding will generate current in the coils of a stationary iron ring armature completely wound with a continuous coil of wire, with ends connected. Such an armature is known as the "Gramme ring" type and such a phenomenon is the basis of every three-phase electric motor, one of the most common types used. If the brushes in contact with the armature rotate at a speed equal to the rotating flux, then the whole combination will act as a direct current dynamo, thus successfully changing alternating to direct current. In practice an ordinary transformer is substituted for the Gramme ring. By connecting several such units in series high voltage direct current is obtained.

The parts of the transformer that carry the high voltages are stationary and can be insulated and cooled by immersion in oil which is considered the most efficient method.

Distribution systems employing alternating current of different phases can be supplied off the same direct current transmission line by the use of step-down transverters of proper construction. This is expected to be especially useful when two systems join as they do in California, where the central section operates on 60 cycle and the southern section operates on 50 cycle a. c. At present the connection is made through motor-generator sets.

WIRE TRANSMISSION OF PHOTOGRAPHS

Science Service

Do not count on telegraphing a photograph of yourself to a friend in a distant city as easily as you can call him up on the long distance telephone.

Although the American Telegraph and Telephone Company has announced the successful wire transmission of photographs from Cleveland to New York, Dr. R. W. King, engineer for the telephone company, states that on account of its cost the new process will be only practicable for large scale use and will not be available for personal exchange of pictures by private individuals.

Within a year, Dr. King declared, the instruments used will be perfected for use by newspapers. The apparatus and wires may be leased as a service to newspapers, but the telephone company will operate the apparatus themselves and the pictures transmitted for at least a few years will be used for publication only.

Photographs and pictures can be transmitted only between cities connected by a superior telephone circuit, and even then high technical skill and constant supervision is necessary to keep the process in successful operation. The instruments are not yet in the commercial stage and have just been developed in the laboratory. As yet they have not been patented and only two instruments are in existence. Emphasizing the need of superior telephone circuits, engineers of the company explained that the slightest difference in the speed of the transmitting and receiving cylinders on which light writes the photograph results in a fantastic ghost portrait. Isolated points where the telephone circuits are not of the highest quality can not hope to benefit by the new telephonic transmission of pictures.

When inquiry was made as to the names of the engineers and scientists responsible for the development of the new process, it was stated that the company considered it a corporate achievement and that no names of individual engineers could ever be mentioned.

Telephone company engineers declared that the new process excels others in swiftness, accuracy and simplicity. In the method of sending photographs by wire developed by Belin, the Frenchman, the original record from which the picture is transmitted must be etched upon a brass cylinder which requires several hours to prepare. The telephone company's new process sends from ordinary photographic film and produces a similar film at the receiving end.

The principal novel features in the apparatus are declared to be as follows: A new type of light valve; the use of a direct current amplifier; an improved photoelectric cell used in the transmitter; use of carrier currents; use of electric filters to separate the carrier currents; the use of a light valve at the receiving end; the use of high-grade telephone circuits.

Demonstration of transmission of photographs by wire from Cleveland and New York by a process developed by American Telephone and Telegraph Company engineers

recalls radio and wire transmission of photographs achieved by C. Francis Jenkins, a Washington inventor, nearly two years ago.

Mr. Jenkins recently exhibited photographs transmitted over the radio by his apparatus, which employs an optical means of impressing the transmitted pictures point by point upon a light sensitive cell that changes the light and shade variations into telephone or radio current modulations. Unlike the telephone company process and all others that have been announced, the Jenkins apparatus transmits from a flat picture, using a prismatic ring lens invented by Mr. Jenkins.

The Jenkins method presents the possibility of achieving radio vision since a speeding up of the transmission to the point where sixteen complete pictures are sent and received each second would be equivalent to the optical illusion of the motion picture. A wave of the hand has already been transmitted by radio in the Jenkins laboratory.

HEALTH AND CHARACTER

Science Service

HEALTH is not necessary for good nature in children, according to Dr. Karl Pearson, as the result of a study of about 2,000 boys and 2,000 girls in English schools. Neither is health nor the lack of it always or even frequently associated with vivacity, popularity or conscientiousness. There was found to be little relation between health and general intelligence.

Athletic prowess went with good health as did self-assertiveness; but the old idea that delicate children take to intellectual work and are particularly shy and conscientious was not confirmed, nor was the similar one that lively boys are likely to neglect studies for physical sports. Blonds were found to be slightly less healthy than brunettes.

Dr. Pearson's results, it is asserted, seem to shatter widely held beliefs. They indicate that it is not possible for teachers to modify general intelligence or psychic characters which seem to be unchanged throughout the whole of school life; that general health changes little during the school period; and that health is not a governing factor of temperament. Health was found to be associated to only a slight extent with qualities of character, and with temper practically not at all.

Babies depend more on their heredity for good health than upon what station of life they are born into or what care they get, concludes Professor Pearson as the result of a similar statistical study of 1,600 babies from a large manufacturing town. The poor health of those not breast-fed is stated to be chiefly due to the inheritance of the weakened constitution of a mother not able to nourish her child. Clothing is important, but it is not highly correlated with health and it becomes less important as the child grows older.

The health of the father and mother is most important, and it is stated to have more to do with the health of the child than the wages of the father or the employment of the mother.

ITEMS

Science Service

THROUGH international cooperation a regular weather bulletin covering a region in the South Pacific Ocean nearly as large as the continental United States is now being broadcast twice daily from Apia, Samoa. Messages are exchanged and relayed between islands 2,000 miles apart, and the forecast from Apia is based upon them. Special storm warnings are also broadcast when conditions warrant them.

AGRICULTURAL officials of the French government in Algeria have found a new method of preventing forest fires. It consists in carpeting the ground under the trees with a hardy creeping plant that will not burn. Juicy plants that do not dry up and that spread rapidly even in the shade are being planted. Not only are the plants incombustible but they have an additional value in conserving the moisture of the soil. Weeds are also choked by the thick, obscuring foliage. The plants used are species of ground ivy.

WHAT place in America is famous for its petroleum refining? Not Texas or California, famous for oil, but New York City and its environs. A survey by the Committee on Regional Plan of New York and its Environs shows that the out-put of refineries in the vicinity of New York represents one fifth of the petroleum wealth of the entire country. It was also found that a region containing one tenth of the population of the country is producing one fifth of the chemical output of the United States. The chemical industry is centered in New York. Yet Manhattan and Brooklyn, New York proper, is rapidly becoming an odorless city, the chemical industry is deserting that part of New York for the open country and cheaper land.

DOCTORS may now take a peep between the ribs of a patient and perform operations on the surfaces of the lungs without removing a section of a rib. An instrument which makes this possible has been invented by Dr. J. J. Singer, of the Washington University School of Medicine. It is smaller in diameter than a lead pencil, carries a small light and lenses, and may be inserted between the patient's ribs after the administration of a local anesthetic. By use of this thoracoscope, as it is called, the surgeon may see just what conditions are at the surface of the lungs and may perform small operations without further incision.

RADIO is not only being used in lighthouses and on light vessels to make more safe the way of those who navigate the dark and foggy sea, but also to make more pleasant and endurable the lonely lives of the men of the lighthouse service. An example is furnished at Cape St. Elias lighthouse on the Alaskan coast. Formerly isolated from the world, the men stationed there now listen in on Los Angeles, San Franciso, Seattle, Portland, and stations as far inland as Nebraska. They report the radio "has certainly made the station a lot more cheerful."