SCIENCE NEWS

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PHOTOGRAPHS OF THE SUN'S CORONA

LONG and expensive expeditions of astronomers to distant parts of the earth to photograph the fleeting phenomena of a total eclipse of the sun may be avoided in the future. The sun's corona, the outer layer of which until now has only been observable when the moon obscures the bright solar disc, has been photographed in full daylight by Dr. G. Blunck, the German astronomer.

In the past many experiments have been made by astronomers to achieve the photography of the corona without waiting for an eclipse, but they have all failed. For ordinary colors, the brightness of the corona is just about the same as that of the sky itself around the sun, so that photographs can not show where one stops and the other begins. The sky itself gives off light largely of blue and the shorter, invisible, ultra-violet, while a large part of the corona's light is in the red, and the longer wave, invisible, infra-red. Accordingly, efforts have been made to take the corona's picture with red, or infra-red, light. So far, these have also been unsuccessful.

Dr. Blunck explains that the reason for these failures is that the previous experiments have been made with rays that were not long enough. For a wave-length of 7,000, which is in the visible red part of the spectrum, the corona is only eight tenths of a per cent. brighter than the sky. This is scarcely enough difference to permit a good picture. However, for infra-red light of 8,500, the corona is 1.7 per cent. brighter than the sky, while at 9,500, it is 2.5 per cent. brighter, which should be enough difference to permit a photograph to be made.

The difficulty comes in securing photographic plates sensitive to these longer waves. Ordinary plates are most sensitive to the blue, hence they are developd in red light. Special plates sensitized before use by immersion in a dye called neocyanin are most sensitive to light of wave-length of 8,000. Dr. Blunck tells of a new dye, called procyanol, that he has used, with which the plates can be sensitized to light at 8,500, and it is with these plates that his efforts have been successful.

Photographs made last year by Dr. Blunck show details that make them appear to be of the actual corona. As a test of his method, however, it has been suggested that the method might be tried at a partial eclipse of the sun, while the moon obscures part of the sun, and part of the corona. If Dr. Blunck's method is really successful, then he should obtain on his plates the outline of the moon, even where it is not in front of the actual solar disc.

THE EFFECTS OF SUNSPOTS ON RADIO

FUTURE radio engineers may be able to look at the sun through a telescope and then tell how the presence or absence of spots will affect the transmission of radio waves as a result of an investigation now under way, at Cambridge, Mass., with the cooperation of physicists and astronomers.

There has just been installed in the Harvard Astronomical Laboratory, under the direction of Dr. Harlan T. Stetson, professor of astronomy, apparatus to study the relation of spots and radio. Greenleaf W. Pickard, Boston radio engineer, designed the apparatus, and installed it for use in cooperation with studies that he has been carrying on for several years. Each day the sun is photographed to give the size and number of spots.

It is not yet possible to say whether or not combination of radio data, with observation of the sun, can ever be used to predict earthly weather conditions. However, according to Dr. Stetson, observations are beginning to make us feel confident that there is a direct connection between conditions in the solar atmosphere and certain atmospheric disturbances on the earth. It seems not unlikely that with the further study of the bearing of sun-spots upon radio reception it will be possible to make allowances for the solar disturbances and by so doing discover more closely than ever before the correlation of radio reception with temperature, pressure and other meteorological phenomena.

Just what happens on the earth when a sun-spot appears on the side of the sun towards us is not fully known. It is believed that electrified particles discharged from the disturbed region on the sun, hurling through space, bombard the upper atmosphere of the earth and are responsible for an increased ionization of the latter which is responsible for the modification of the intensity of the radio waves.

The station from which the signals will be sent, which are measured at the Harvard Laboratory, is WBBM, Chicago. The apparatus, which automatically records signal strength, as received in Cambridge, is carefully calibrated each day and makes it possible to record the measurement in absolute units of electrical intensity.

Dr. Stetson explained the apparatus was so designed that it would measure the intensity of the carrier wave and would scarcely be affected at all by superimposed modulations caused by the broadcasting of music.

3,600,000 VOLTS OF ELECTRICITY

THREE million, six hundred thousand volts of electricity can now be stored in artificial "clouds" and discharged in a ten millionth of a second, thus imitating in the laboratory the effects of lightning more accurately than ever before. This feat has been accomplished at the laboratory of the General Electric Company, at Pittsfield, Mass., by F. W. Peek, Jr., who spoke before the recent regional convention of the American Institute of Electrical Engineers at St. Louis. Such a voltage is seventeen times as great as that carried over even the highest voltage power lines.

As these sparks last but a ten millionth of a second, and as light travels about 100 feet in that time, the blinding flash is all over when seen by a person only a hundred feet away. Yet the flash appears to be there when he sees it!

Although these voltages frequently have a duration of less than a millionth of a second their rate of rise and fall or wave shape has been accurately measured by an instrument using a beam of electrons as a pointer and known as a cathode ray oscillograph.

The object of the study is to secure scientific information on the nature of electricity and to obtain further engineering information on the protection of life and property against lightning, to build transmission lines, transformers and other electrical apparatus to resist lightning voltages. Lightning is one of the greatest foes to electrical apparatus and much has already been done in this laboratory to produce lightning-proof apparatus. The present generator produces higher voltages than ever produced by natural lightning on transmission lines.

THE OX5 AIRPLANE ENGINE

To those in aviation OX5 means the Curtiss water-cooled 90-horsepower engine that has powered so many airplanes in the decade since the war. Last year during the boom in aircraft production that accompanied the extraordinary development of airways, flying fields and aviation exploits, 65 per cent. of the estimated 1,653 airplanes produced for commercial use were powered by OX5 engines.

For the OX5 was the airplane engine produced in quantity for war use. Probably no other airplane engine has had such quantity production. Some 17,000 were in storage at the end of the war. They were sold cheap, cheaper than they can now be produced to-day. And that is the secret of airplanes being quoted on the market at the cost of a medium-priced automobile. You can buy an airplane, f.o.b. the flying field, for as little as $2,500.

The supply is about exhausted. Airplane manufacturers estimate that the last of the easily available, cheap OX5's will be installed in airplanes to be built by the end of this month (March). The threatened engine shortage may have a tendency to slow down the booming airplane production that has been stimulated by the quickening aviation interest in this country. One manufacturer last year produced more than one airplane per working day of one OX5-engined type alone, and the production possibilities of this plant are now said to be as high as eight airplanes a day. Several other manufacturers are contemplating large-scale production.

Realizing the need of a cheap and reliable engine to take the place of the OX5, several engine manufacturers are producing experimentally on a small scale low-powered motors, most of them air-cooled. Nine established engine manufacturers are producing in this country, but many of them are occupied with the production of the larger engines for transport, mail and military airplanes and have not yet entered the low-price field. Some see in the Ford aircraft activities a promising future source of inexpensive engines for the aircraft that Americans are beginning to demand in much the same spirit that they bought automobiles in the early years of the century.

THE ANTARCTIC ICE

ANTARCTICA, whose desolate ice fields will soon re-echo the roar of Commander Byrd's motors, has enough ice to cover the whole earth to a depth of 120 or 130 feet, and has been gathering this vast store of solidified cold for a quarter of a million years or more.

This is the opinion of Professor W. Meinardus, of the University of Göttingen, who has been engaged lately in an endeavor to estimate the bulk of the ice that covers the south polar continent. He is of the opinion that only a small part of the elevations of from 6,000 to 10,000 feet reported for the surface of the Antarctic plateau can be made up of solid land. Most of the mass, he thinks, consists of accumulated ice, piled on a foundation of rock not more than about 2,000 feet in mean elevation. Professor Meinardus derives this estimated land height of Antarctica from an average of the mean elevation of the nearest continents, South America, Africa and Australia. Everything above that is ice.

Multiplying the estimated average thickness of this massive sheet by the area of Antarctica, Professor Meinardus obtains a total of twenty-six quadrillion (26,000,000,000,000,000) cubic yards of ice, weighing about twenty quadrillion tons. There is enough ice there, he says, to cover all Europe to a depth of over 6,500 feet, or to blanket the whole earth under a layer between 120 and 130 feet thick. Melted down, it would raise the world's general ocean level approximately 100 feet.

From the slowness of glacial movements in the Antarctic region, Professor Meinardus has come to the conclusion that at least part of the southern ice mass has been there since Pleistocene geological times. This is variously estimated at from 250,000 to 400,000 years ago, so that the ice of Antarctica has been in cold storage at least a quarter of a million years.

THE CORN BORER IN RUSSIA

THE European corn borer, on which the United States is now waging costly war, is an old and troublesome story in Russia. It is a pest throughout the southern half of European Russia, and occurs in less destructive numbers in an additional stretch of territory to the north. Its northernmost extension carries it to the latitude of the Gulf of Finland, which is as far north as Hudson Bay in the western hemisphere. At this latitude in Russia it is not counted especially bad, but serious outbreaks occur in the new Baltic nations, formerly a part of the old empire

The borer plague is felt especially in the south, where the cornfields of Russia merge with those of Roumania, and swing eastward across the shores of the Black Sea and up the great river valleys. In the eastern part of the south Russian grain belt corn gives way to millet, which is better adapted to the drier steppes; but the borer afflicts the millet as well as the corn, and efforts are now being made to find varieties less susceptible to its attack

Russia has no measures against the pest that have not already been recommended in the United States. The best means are the most laborious: a thorough clean-up and burning of all stalks that are not fed to cattle. The burning must be thorough, too, for according to A. Dobrodeyer, a well-known agricultural scientist, borers have often been seen emerging from stalks that were charred black on the outside, apparently none the worse for the experience. He has also seen borers coming out

of stalks that had been left lying about in farm yards after the feeding of cattle, although these had been tramped about for weeks in snow and frozen mud.

The great increase in corn borer infestation in Russia seems to have taken place shortly before the World War. In 1908 a 20 per cent. infestation was observed in the fields of the Government (State) of Ekaterienoslav. This initial infestation took approximately an additional 20 per cent. of the stalks in each of the following years, until by 1912 practically every stalk in the afflicted fields had its borers.

INOCULATION FOR CHICKEN POX AND MEASLES

CHICKEN-POX may be added to the list of diseases that can be prevented by vaccination. Dr. Jean V. Cooke, of the Washington University School of Medicine at St. Louis, Mo., has reported to the American College of Physicians, meeting in New Orleans, that inoculation of exposed children with serum from convalescent patients has successfully prevented cases of both chicken-pox and measles.

Though the former is sufficiently mild, a disease not to require general protective measures, its appearance in epidemics in institutions causes considerable difficulty, especially in the very young children affected. Of a total of 369 cases of exposed children, vaccinated for chicken-pox described in medical literature, Dr. Cooke declared, only 74, or 20 per cent., developed chicken-pox. Of 206 unvaccinated exposed children observed as controls, 158, or 77 per cent., contracted the disease. Such immunity is temporary but serves to protect orphanages and schools from an epidemic.

The preventive treatment for measles should be concentrated on account of the danger of complications on infants and young children under five years of age. Results with this method show, he stated, that almost 90 per cent. of children given convalescents' serum during the first week after exposure fail to develop the disease.

ITEMS

THE probabilities that the influenza epidemic now ravaging Japan will afflict this country are not great, in the estimation of public health officials. Until this disease appeared in Japan the world in recent months had been comparatively free from it. The epidemic is expected to die out with the coming of spring and the warmer weather that checks the respiratory diseases. Fall and winter are the influenza seasons and, unless this tricky disease takes a new turn, health specialists consider a spring and summer epidemic unlikely. As the spring is now further advanced in Japan than in this country, reports of the subsidence of the epidemic are expected shortly.

TURQUOISES and other rare and beautiful objects which were buried beneath an altar in Chichen Itza some 700 years ago have been discovered by Earl Morris, archeologist of the Carnegie Institution of Washington. A telegraphic report from Mr. Morris states that the space beneath the altar has not been fully explored, but articles which have been removed from their hiding place prove it to be the most important cache of Maya objects known in Yucatan. A magnificent mosaic disk, containing one thousand beautifully cut and polished turquoises, is pronounced the most elaborate and beautiful product of the Maya civilization that has ever been discovered. The altar find was made in the Temple of the Warriors, which is one of the masterpieces of Maya architecture. Each column in the temple is graven with the figure of a warrior in full regalia, and it is believed that the eighty or more warriors are all portraits of real Maya heroes. The temple, however, was built in honor of the Plumed Serpent, an important Maya deity.

SPRAYING on paint with a gun, a process that has practically revolutionized finishing in the automobile industry in recent years, is under indictment as a source of considerable health hazard. A representative committee, appointed by the National Safety Council, has just reported upon an investigation of twenty-nine plants and groups of workmen, including automobile and vitreous enamel concerns as well as contracting painters. Several workmen gave evidence of benzene poisoning acquired from spraying benzene lacquers, while the indications of lead poisoning were called "distinctly significant." The danger of silicosis from silica dust particles in the air was apparently not so great though three positive cases were found. As a remedial measure the committee suggested the use of what is known as the positive pressure respirator for the general protection of paint sprayers. Persons spraying compounds of lead or benzene should receive periodic medical examination, the committee declared. It also recommended that manufacturers of paints, lacquers, shellacs and vitreous and varnished enamels to be used in spray coating should eliminate as far as possible benzene, lead and free silica from their products.

CASABA and honeydew melons have been added to the list of fruits which can be given the color and texture of ripeness by treatment with ethylene gas, as a result of researches carried on by Dr. J. T. Rosa at the University Farm at Davis, Calif. Partly ripe melons, with rinds still green and flesh still hard, were subjected to the gas at a concentration of one part in 4,000. They assumed the orthodox "ripe" color, and their flesh became soft. The sugar content, however, was not raised by the treatment. For this reason the hastening gas treatment is not recommended for fruits picked before a fairly advanced stage of maturity.

LOCUSTS, one of the causes of the famines that periodically threaten the great grain-raising plains of Russia, are being fought with the latest means of chemical warfare from the air. During 1927, Soviet agricultural officials report, nearly 77,000 acres of agricultural lands were sprayed with chemicals from airplanes, as compared with only 2,700 acres in 1925.