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THE CORONA OF THE SUN

THE sun's corona consists not merely of the spectacular array of pearly-hued streamers seen during a total eclipse, but of a uniform, globular, million-mile-thick blanket. Such is the revelation of photographs snapped from a sub-stratosphere airplane during the June 8 eclipse by Major Albert W. Stevens, known for his stratosphere balloon explorations, who was a member of the Hayden Planetarium-Grace Eclipse Expedition. The implications of this discovery were discussed at a conference held recently at the Harvard College Observatory.

Leading astronomers attending the conference say that Major Stevens's plates "clearly show the corona as a globular shell surrounding the sun with a depth considerably greater than a solar diameter." Heretofore astronomers studying the corona have devoted most of their attention to the radiant streamers which completely dominate the usual eclipse photographs taken from the ground. On these plates, however, the bright tracery has been proved to be of secondary importance in the immense globular envelope.

According to Dr. Harlow Shapley, director of the Harvard Observatory, the great difficulties encountered by Major Stevens in making his observations at a 25,000-foot altitude were well worth while, for it was this great height that made these remarkable pictures possible. In the sub-stratosphere he was above approximately two thirds of the earth's atmosphere, and thus avoided most of the dust particles and air molecules which tend to obscure ground pictures of such difficult subjects as the corona. Further analysis of the corona must await the South American-South African eclipse three years hence, when it is planned to study the phenomenon from the sub-stratosphere with ultra-violet lens systems, spectroscopes and polarizing screens.

Dr. Donald H. Menzel, of Harvard University, leader of the Harvard-Massachusetts Institute of Technology Expedition to Siberia last year, has re-examined plates taken last year, and has found the globular coronal blanket recorded on some of them, although, because of the brighter sky background, they did not show nearly so clearly as on the photographs taken in the sub-stratosphere. Two European astronomers, Bergstrand and von Klueber, had obtained previous indications of the globular form of the corona, but a complete appreciation of its nature was not reached until Major Stevens's pictures were studied. Rigid tests by Dr. Kenneth Mees and Dr. Walter Clark, of the Eastman Kodak Laboratory, and by Dr. Brian O'Brien, of the Institute of Optics of the University of Rochester, were made to investigate the possibility that the unusual appearance of the corona was caused by optical or photographic defects, or by minute ice particles in the stratosphere.

Major Stevens's pictures were taken near Lima, in a Pan-American Grace Airways plane, piloted by Captain Charles Disher and co-pilot W. E. Gray. W. O. Runcie, Lima photographer, assisted in making the pictures. They include 11 photographs with a 24-inch camera, four with an 8¼-inch camera and 150 feet of motion picture film made with a 6-inch lens.

RECORDING BIRD VOICES BY SHORT-WAVE RADIO

CULMINATING an expedition on which the voice of a bird was recorded on film by means of radio for the first time, ornithologists at Cornell recently pronounced successful the first records ever made of the voice of Atlantic petrels. Albert R. Brand, of the laboratory of ornithology at Cornell and pioneer in bird-song recording, did the field work in cooperation with the department of zoology of Bowdoin College. Taking Harold Axtell, of Cortland, N. Y., as his assistant, Mr. Brand traveled in his sound truck to northern Maine, ferried across to the island of Grand Manan, and arrived within six miles of Kent's Island, where Bowdoin College maintains a biological laboratory under the direction of W. O. Gross. A powerful short-wave radio station, VE1IN, is maintained on the island, in charge of Thomas Gross and a corps of operators. This was made available for the project in sound-recording.

In burrows dug in the loose soil a mile from the laboratory among the rocks on the outer slope of the island nests a colony of Leach's petrels. The petrels are nocturnal in their habits, and a strange concert arises from the mouths of these burrows before the males go in search of food for the young. Mr. Brand wished to get an accurate record of this frog-like chorus of bird voices. Faced with the impossibility of getting a sound truck to the island, the expeditionists laid a mile of telephone wire from the radio station to the petrel colony. The sensitive microphone with its parabolic reflector used by Mr. Brand in his sound recordings was attached to the end of the telephone line. A new portable field amplifier developed by Professor True McLean and Paul Kellogg, of the laboratory, which could be carried easily over the rocks, amplified the petrels' song sufficiently so that it could be sent to the radio station with little loss.

As the petrels stood at the entrance of their burrows or wheeled about overhead giving their croaking notes, the microphone picked up the sounds and with the aid of the amplifier sent them to the radio station, whence they were carried across the intervening six miles of the Bay of Fundy to the sound truck waiting on the island of Grand Manan. In the sound truck the electrical waves set up by the voices of the birds caused a tiny galvanometer to deflect a ray of light on the edge of a motion picture film which shot past the vibrating light at the rate of 90 feet per minute.

Listening to the developed film as it was played through the reproducer at Cornell, Professor Arthur A. Allen reported that not only the voices of the petrels were recorded successfully, but many other sounds that emanate from Kent's Island at midnight were gathered in and permanently recorded on the film. The voice of the

European nightingale has been broadcast a number of times from gardens near London, England, but this is believed to be the first time that the voice of any bird has been recorded on film by means of radio.

THE USE OF TETANUS ANTITOXIN IN STREET ACCIDENT CASES

TETANUS antitoxin, the lockjaw preventive, should be given to every person injured in a street accident, even if the injury is only a small scratch or cut, physicians are reminded in a warning appearing in the *Journal* of the American Medical Association. Fresh evidence for the need of applying this preventive measure is reported by Dr. Eric C. Gilles, of the Johns Hopkins University School of Hygiene and Public Health. Dr. Gilles reported that the germ that causes lockjaw, or tetanus, was found in nearly one fifth of 63 samples of dust collected on down-town streets in Baltimore. Hospitals have recently been called old-fashioned for adhering to the custom of giving the tetanus antitoxin to all persons scratched or cut. The practice could be abandoned, some physicians argued, because since the disappearance of horses from the streets of most cities, street dust probably would not harbor the tetanus germs. These germs, according to generally accepted theory, regularly inhabit the intestinal canal of man and other animals. Dr. Gilles asserts on the basis of his findings that tetanus germs, however, are widely distributed in street dust. Hospitals are thus vindicated in adhering to their practice of giving the antitoxin to all victims of street injury. The fear that some persons sensitive to the serum of the antitoxin may be made temporarily ill by it is not, in his opinion, sufficient justification for failing to give this preventive of a horrible and fatal malady.

INSULIN AND DEMENTIA PRECOX

INSULIN, the gland extract that makes life possible for thousands of persons suffering from diabetes, is rescuing other thousands from the living death of insanity. From Oklahoma State Hospital come reports of three more once hopelessly insane patients cured, and six others on the road to recovery as a result of treatment with insulin. The total number of such cures is well over a thousand now, and apparently is increasing every month.

The new method of treating the mental disease, dementia precox, was discovered by Dr. Manfred Sakel, of Vienna. It consists in giving large doses of insulin so as to produce a state of shock. In treating diabetes, small doses of insulin are given, and the physician is careful to avoid producing shock or coma, which may end fatally. A fatal outcome is the chief danger of the insulin shock treatment for mental disease. Physicians and nurses stand by while the patient is undergoing treatment, ready to give sugar at just the right moment to snatch the patient from death and back to sanity. The shock is allowed to continue from one to three hours, depending on the effects produced, and a series of insulin shocks are necessary to achieve the cure of the mental disease.

Why insulin shock restores sanity in some cases is not as yet definitely known. It apparently is more successful in the case of young patients, or patients who have not been mentally ill for long. The layman who has seen a dementia precox patient sitting off by himself, absorbed in his own dreams and apparently oblivious to what goes on around him, might readily feel that a strong shock of some kind would jolt the patient back to normal awareness or wake him out of his dream state. Heretofore, however, no method of treatment has succeeded in doing this and hundreds of thousands of patients, mostly boys and girls under twenty years of age, have been doomed every year to a hopeless future in a hospital for mental disease.

In diabetes, insulin saves lives by enabling the patient's body to burn sugar from food in a normal manner. In dementia precox, Dr. Sakel believes that the gland extract acts by isolating short circuits in the brain which are responsible for the mental disease. The short circuits, according to his theory, are produced by injury to the brain and cause mental confusion because messages for one part of the brain get mis-sent to another part. When it is finally discovered how insulin shock works to cure the mental disease, it is hoped that an explanation will have been found of what causes this mental ailment.

UNSHRINKABLE WOOL

A NEW, revolutionary method which solves the old problem of making wool unshrinkable, without damaging it in any way, has been invented by A. J. Hall, an English textile chemist. The important feature of Mr. Hall's process is that it permits shrinking wool without adversely affecting its durability, its original softness and fluffiness, and its color—something which heretofore has proved to be impossible. These defects have been associated with unshrinkable processes for over forty years, since they were first practiced. In spite of much research, they have remained unsolved.

Extremely simple, Mr. Hall's method merely consists of dipping the wool in a solution containing the chemical sulfuryl chloride. It is dissolved in "white spirit"—a solvent which is used a great deal in dry cleaning. One and a half to a two per cent. solution is used and the treatment lasts about an hour. Previously it was thought that to make wool unshrinkable, treatment with chlorine in some active form—like sodium hypochlorite or chlorine gas was necessary. But always the wool came out with a harsh feel. If it had been dyed, the treatment bleached the dyes. Then if such unshrinkable wool was made into clothes, they did not last as long as garments made out of untreated wool.

Tests on wool treated by Mr. Hall's processes show that all these defects are overcome. The wool has the original soft and fluffy feel. It is just about as durable as the untreated wool. Its color and the dyes on it are not changed in the least. The wool does not seem to be chemically altered. Other features of the new method are: Wool can be treated as it comes from the sheep's back or in the form of socks and other clothing. The wool does not have to be washed first, or treated in any special way. The treating solution can be used over and over again and Mr. Hall has used the same solution for over a year. It is only necessary to add sulfuryl chloride as it is used up, and occasionally to purify the solution once in a while:

Wool mixed with rayon and cotton can be treated without harming these fibers, provided they are not too damp.

SOME FURTHER PAPERS READ AT THE DENVER MEETING

THE nervous patient, unduly tense and excited when his physician begins an examination, can now have the exact state of his nervousness measured by a new instrument, the neurovoltmeter, described by Dr. Edmund Jacobson, of the Chicago Laboratory for Clinical Physiology. The neurovoltmeter is a simple instrument using a string galvanometer and fine, sharpened wire electrodes that are inserted into nerve or muscle tissue without undue discomfort. It will measure variations in electrical nervousness amounting to fractions or millionths of a volt. It is expected that the new instrument will permit the physician to keep track of effects of even the most delicate treatment upon the nervous and muscular system. The study of mental disease will also be advanced by its use.

THE problem of leprosy control was outlined by Dr. Esmond R. Long, of the Henry Phipps Institute, Philadelphia. Tuberculosis in man and animals, leprosy in man and leprosy-like diseases of animals, and a cattle plague known as Johne's disease are all caused by members of the same germ family. These germs are known as acid-fast bacilli because the slender rod-shaped organisms all take a red stain or dye and hold it fast even when washed with acid. These acid-fast bacilli are alike in another important respect. No matter what part of the body or what organ they affect, they all cause the same initial reaction in the body. Their presence is the signal for the appearance of large, single-nucleus scavenger cells which gobble up the bacilli and try to destroy them. But the bacilli cause chemical changes in the scavenger cells, turning the latter into epithelioid cells. Groups of these cells form the tubercles of tuberculosis. A chemical attack on the tuberculosis bacilli and related germs, sponsored by the National Tuberculosis Association, has shown that all these germs, whether they cause leprosy, tuberculosis of man, tuberculosis of cattle, or other disease, produce many of the same chemicals in their tiny bodies. Each of them, in addition, produces one or two chemicals of its own, entirely different from those produced by any other germ. Certain of these individual chemicals of the human tuberculosis bacillus can produce the same changes in the body's scavenger cells that the living bacilli produce.

WITH climatic changes larger than those that brought the droughts and windstorms of the past few years, there would be a migration of man from the fertile parts of the nation where he now lives, according to Dr. M. M. Leighton, chief of the Illinois State Geological Survey. But a more immediate problem than a possible return of the glacial period is preventing the drift of fertile soils. Midwestern farmers must conserve and protect their greatest natural resource. Dust storms take place even in a moist climate if bare areas are exposed to the wind. In more arid regions the balance between erosion and vegetation is so critical that man must actively aid nature.

ITEMS

"BEST paved country in the world" is the somewhat envious tribute of German highway engineers to the United States. Their figures show that of the 12,000,000 miles of highway in the world, nearly half, or 5,600,000, are in America, with 5,000,000 miles in the United States alone. Europe has 3,900,000 miles, Asia 1,250,000, and the remainder of the mileage is about equally divided between Africa and Australia. In Europe, France has the best developed highway system, with 465,000 miles. Germany follows, with 250,000 miles; England has 210,000 miles, Poland 160,000, Italy 125,000, Sweden 80,000, Belgium 22,000, the Netherlands 19,000, and Switzerland 11,000 miles.

THE new type airplane de-icing mechanism which substantially reduces the danger of rips has been approved by the U. S. Bureau of Air Commerce. The device is an improvement on the well-known rubber "overshoes" on the leading edge of airplane wings and tail surfaces. These overshoes could be expanded and contracted by compressed air, breaking up ice formation so that the wind whistling over the wings could blow it away. One trouble was that if a small hole developed in these rubber de-icers it might become enlarged and soon render the whole mechanism ineffective. The new improvement uses fabric reinforcing strips in the rubber covering which prevent rips from spreading beyond the limits set by the strip. Thus, small holes can become no larger and partial operation, at least, of the de-icer will be possible. The B. F. Goodrich Rubber Company developed the de-icers in collaboration with the following government agencies: Bureau of Air Commerce, National Advisory Committee for Aeronautics, United States Army Air Corps, Naval Air Service. Cooperation with the commercial airlines was also employed.

DRS. A. B. RIVERS AND L. A. CARLSON, of the Mayo Foundation, advise that vitamins, especially vitamin C, should be added to the diets of stomach ulcer patients. Patients whose ulcers have a tendency to hemorrhage should, in particular, be given extra vitamins. They pointed out at a recent staff meeting of the Mayo Clinic that the usual stomach ulcer diet is apt to lack sufficient vitamins. Finding this to be the case in a number of their patients, doses of vitamin C in the form of cevitamic acid were given. In all cases the amount of vitamin C in the blood, which had been low, returned to normal and the general condition of the patients improved markedly. Vitamin C, found in fresh fruits and vegetables, particularly the citrus fruits, has a tendency to prevent hemorrhage, which makes it valuable in ulcer cases. Lack of this vitamin produces a disturbance in body tissues and their cells which may keep them from absorbing all the essential nutrient materials from the food eaten. If the tissues lining the stomach are in this unhealthy state, as a result of vitamin lack, the nutrition of the body can not help being disturbed and the stomach lining itself must have less resistance to erosion or ulceration. Giving extra amounts of the vitamin should therefore help the patient.