SCIENCE NEWS

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SEVEN MINUTE SOLAR ECLIPSE OF 1937

THE longest total eclipse of the sun since 1804, lasting seven minutes and four seconds, is the chief event on the astronomer's calendar for the new year. This will happen on June 8. Unfortunately, there is no land at the place where it lasts longest, in the middle of the Pacific Ocean. Useful observations can be made from shipboard, but the slight unsteadiness of a ship, even on a calm sea, will prevent many researches for which this long eclipse would be ideally adapted.

On June 8 the shadow first touches earth in the Pacific Ocean in the vicinity of the New Hebrides, where the sun will rise eclipsed. Then it crosses the ocean and leaves the earth in Peru, where the sun sets while still hidden. At both the beginning and end of the track, the duration will not be as much as at the center, and the sun will be very low in the sky, which will hamper observations. At the center of the path, latitude 9 degrees 54 minutes north and longitude 130 degrees 40 minutes west, the eclipse occurs at noon, the sun will be nearly overhead and will be hidden for the full time. But the only islands which the shadow track touches are Christmas Island and Fanning Island, one on the northern, the other on the southern edge, where the duration is not much more than two minutes.

One of the greatest values of such a long eclipse would be long exposure photographs, possibly with infra-red sensitive plates, to record the outermost and faintest parts of the sun's corona, its outer layer which appears only at eclipse time. Because of the instability of a boat, only short exposures will be possible. However, good eclipse pictures have been made from airplanes and a boat should be much better. Also, there are other eclipse observations, such as those of the behavior of radio waves in the moon's shadow, that can be made just as well from shipboard as from land. In addition to the scientific aspects, a total eclipse of the sun is perhaps the most impressive spectacle that nature has to offer and this one should be the finest in many years. Probably cruises will be operated to take spectators to watch it, and these naked-eye observations will be just as satisfactory from a ship as from any other post. At this time of year the weather should be perfect and the seas very smooth.

A third eclipse will happen during 1937. This will be of the moon, when that body enters the shadow of the earth, and happens on November 18. This will not be total, but partial, as the shadow will only cover about a tenth of the moon's diameter. On May 11, another body will come partly between the earth and the sun, but it will be so small that telescopes will be required to view it. This will be the planet Mercury which will just touch the edge of the sun's disc and will appear as a notch. This partial transit of Mercury is very rare. The planet is so small that when it crosses the sun at all, it usually is squarely in front of the disc. However, it is of no particular scientific importance, except to check on the accuracy of the predictions of the planet's motion.

PREVENTION OF FATAL BLOOD CLOTS BY PURIFIED HEPARIN

FATAL blood clots in the veins or arteries, the tragic consequence in many an operation and blood transfusion, may be prevented in future by the use of heparin, it appears from a report of a University of Toronto research group to the Canadian Medical Association. Members of the research group are Drs. D. W. G. Murray, L. B. Jacques, T. S. Perrett and C. H. Best, the latter a co-discoverer of insulin.

Heparin acts in two ways: (1) By making the blood clot more slowly, which would make it a valuable aid in blood transfusions where there is always danger of clotting; (2) by preventing dangerous narrowing or closing of the veins following injury to them. Heparin was first prepared from the livers of dogs by Dr. William H. Howell, professor emeritus of the Johns Hopkins University. As little as one milligram, about one hundredth of a grain by weight, will prevent clotting for an hour of about an ounce of blood, he found in his original investigations. Use of this potential life-saving remedy was limited because of lack of sufficient supply of the material in highly pure form. This has been overcome by Drs. Arthur Charles and D. A. Scott, of the Connaught Laboratories. Their highly purified heparin has been used safely and successfully in both human patients and dogs. This heparin slowed the clotting of blood from a normal of 8 minutes to a maximum period of 30 minutes.

Heparin's effect on the veins may be equally important. The veins may be thought of as hollow tubes through which the blood flows. If injury or disease makes the walls of these tubes thicker, there may not be enough room for the blood to get through, and the veins are said to be occluded. It is thought that this may be a factor leading to formation of blood clots, which would completely block the circulation. The danger from such clots depends on the importance of the vein in which they form. Heparin reduces the chance of such clots by its effect on the blood and in addition prevents the closing of a vein following injury. If injections of heparin are continued long enough in such cases the injured vein heals and there is greatly reduced tendency for it to close up after heparin treatment is stopped. Injecting heparin into a vein affects the blood throughout the entire body, making it clot less readily. Injecting it into an artery, on the other hand, produces a more local effect. This arterial injection affects the blood flowing through the particular arm or leg where the heparin was injected.

PERSUASIVE METHODS IN THE CONTROL OF SYPHILIS

SYPHILIS is being controlled by "persuasion" at the clinic of the University of Pennsylvania Hospital, Philadelphia. This new public health method of dealing with the infectious syphilis carrier is proving surprisingly

successful. Louise Brown Ingraham, social service worker, gives a full account of the "persuasive approach" in the forthcoming issue of the *Journal* of the American Medical Association. This hospital's work with syphilis carriers is being aided by a grant from the Milbank Foundation.

The clinic, by friendly sympathy, persuades the syphilis patient to disclose the identity of his recent sexual intimates. Then it convinces him that it is his duty to the community to persuade the person or persons involved voluntarily to seek a medical examination for syphilis. If the patient does not wish to approach his contacts himself, the hospital social workers take over the task, in no case divulging the source of their information.

So successful has the university clinic been that of 201 patients with syphilis, 114 identified 174 exposures. Eighty per cent. of these persons have been located, and 73.5 per cent. have been recruited for examination. The type of community—white or colored, poor or well-to-do—has little effect on the response of the individuals. Mrs. Ingraham's figures show that the communications of the social worker—office interviews, home visits, letters, etc., instrumental in the accomplishment of 128 examinations for syphilis—cost $5.22 per successful case.

The technique is equally applicable in public health undertakings, the doctor's private office, the home or the hospital clinic. The approach dips deep into the heart of the individual and society, slowly brings into the community a realization of the ominous prevalence of syphilis and makes possible a more intensive medical attack. It appeals to the ideals of the individual, maintains his self-respect and upholds his position in society. A small organization for the treatment of syphilis can, through the use of the voluntary approach, obtain a following of faithful patients who will support its chosen public health activities and assist in the spreading of intelligent syphilis propaganda.

USE OF THE ULTRA-SHORT RADIO WAVES

T. A. M. CRAVEN, chief engineer of the Federal Communications Commission and guest speaker at the First National Conference on Educational Broadcasting held in Washington on December 10, reported that the ultra-short radio wave-lengths are now being considered for addition to the practical radio spectrum.

Present practical usefulness of the radio goes down to the short waves with a frequency of 30,000 kilocycles (10 meters). Already under consideration and due for use very soon is the radio spectrum band from 30,000 kc to 200,000 kc, or to one and a half meter waves. At first glance this seems to be a tremendous increase over the present 30,000 kc. However, again we find distinct limitations because of the increasing demands and because of new developments. Acceptable television will need over half of the now untapped radio frequencies. Blind landing systems for airplanes, with their great increase in aerial safety, would use these wave-lengths. Facsimile transmission by radio would likewise require this radio band. Finally there is the growing use of light-weight portable transmitters in the police and forestry services, which require the use of these new short waves. At a recent hearing of the Communications Commission the preliminary estimate of the radio needs of the government services alone was such that one half of the newly developed portion of the radio spectrum would be required.

Speaking with Mr. Craven on the program were Dr. C. B. Jolliffe, former chief engineer of the commission and now with the Radio Corporation of America, and Dr. Alfred N. Goldsmith, well-known radio consulting engineer of New York City.

All three men, without stating so in so many words, pointed out that the dream of some educators to have 15,000 stations serving 127,000 school districts was a hopeless impossibility. They stressed the technical and international aspects of broadcasting and emphasized that every time a new radio band is made available there seems to be room for everybody who wishes to operate a radio transmitter; but that the crowding ever becomes greater on the radio waves.

THE STUDY OF RADIO AUDIENCES

DR. HENRY C. LINK, of the Psychological Corporation, New York, told a discussion group at the First National Conference on Educational Broadcasting at the Mayflower Hotel, Washington, on December 11, that a million dollars a year is being spent by business executives to find out how many people listen to their radio broadcasts. But still they do not know anything about the extent to which their listeners are really paying attention to the program.

Sponsors of educational programs also have a need to study their audiences. Even the rough measures now obtained by the sponsors of commercial programs of the numbers listening in are of value in planning programs to meet the interests of listeners. He told of a survey made by means of personal interviews in farm homes, rural town homes and cities. The audiences found for the educational programs at these centers were pitifully small in comparison with the audiences for commercial or sustaining programs, even when the relative power of the stations is borne in mind. On the other hand, an amazingly large number of commercial programs were described, by many of these people, as being programs of general educational value.

Professor Edward S. Robinson, of Yale University, reported at another session of the conference that mere repetition may not deserve the faith that radio advertisers have in it as a means for impressing audiences. The discoveries of psychologists have great importance to successful educational broadcasting. The matter of repetition he cited as an example. Rare is the occasion upon which a new idea is grasped from a single presentation. Yet the ideal of educational broadcasting is not to be gained from the often fatiguing and annoying repetition in which the commercial advertiser has such faith. The results obtained from many studies of learning indicate that the optimal repetition varies with the material presented, with the audience and with many other factors.

Professor Robinson indicated that arguments over whether the radio is as effective as the printed word or some other means of communication are pointless. The

radio is being used and will continue to be whether or not it is as effective as some other method of communication. The psychologist can aid in the improvement of broadcasting technique.

GERMANY'S MINERAL RESOURCES

THE threat of war and lack of foreign exchange are driving Germany into a position where millions of marks each year are diverted into subsidies in the mineral industries, reports Charles Will Wright, foreign mineral specialist at the Consulate General, Berlin, to the U. S. Bureau of Mines in an analysis of Germany's mineral resources.

Petroleum products, iron ore, manganese, chromium, tungsten, bauxite, copper, lead and sulphur are only a few of the raw mineral essentials that Germany must obtain either by import or by costly subsidized production at home. Low-grade deposits of minerals are being worked by highly efficient but extremely costly plants which would be worthless if international trade in its former sense reappears. Synthetic gasoline, as an example, is being made in large amounts from coal by the Bergius process but the cost of this fuel in Germany is four times the world price. Coal is the major mineral blessing enjoyed by Germany, for the nation owns 39 per cent. of Europe's coal reserves to-day, even though this is an appreciable drop from the pre-war holdings of 50 per cent.

Characteristic of Germany's mineral troubles is copper. There is but one worthy copper mine in the country and this has been subsidized in the last three years to the extent of 38,000,000 marks. Sulphur, whose main function is to be turned into carbon bisulphide for use in rayon manufacture and for vulcanizing rubber, comes half from by-product production in Germany and half from imports. High duty brings the price of the latter up to that of the internal product. Of all the nonferrous metals zinc is the only one which Germany appears to have in quantities sufficient to supply ultimately its domestic needs. Tin and antimony can be obtained by import only. The situation for lead is more encouraging and it is hoped that through government aid the present imports of lead and lead ores can be reduced from the present two thirds to one third of the requirements. Although Germany is the largest producer of aluminum in the world, only a fraction of the production comes from native sources. Hungary, Yugoslavia, France and Italy are the principal sources of the aluminum ore imported by Germany.

ITEMS

MARCUS AINSWORTH, statistical editor of the trade journal *Automotive Industries,* announces that motor vehicle registration has reached an all time high during 1936, with 28,427,077 vehicles listed. Previous high was 26,657,072 in 1930, just after the peak production year of 1929. The 1936 totals split into 24,459,940 for passenger cars and 3,964,137 for trucks and buses. Registration of commercial vehicles gained 11 per cent. over 1935 figures and passenger cars were up 8 per cent. Utah was the leading state in registration increase with a gain of 26.8 per cent. The District of Columbia came next with an advance of 26.6, followed by Nebraska with 21.9, Indiana with 20.8, New Mexico with 17.8 and Connecticut with 14.9 increase. New York state maintains first place in total registration with 2,464,400 vehicles, California being a close second at 2,425,000. Pennsylvania, Ohio, Illinois, Texas and Michigan follow in that order.

INCOMPATIBLE human couples frequently fail to have children, though if they are divorced and find themselves new mates the new marriages may be fertile. Similarly, some of the plants investigated in research at the New York Botanical Garden, under Dr. A. B. Stout, could not produce seed when crossed with each other, but when used in hybridization experiments with different plants reproduced quite normally. This physiological difficulty between particular strains of plants has been given the technical name, protoplasmic incompatibility. A graphic display illustrating these conclusions has been prepared for display by the Women's and Professional Division of the Works Progress Administration.

LACK of the fertility vitamin E may lead to the development of cancer, it appears from experiments with chicks reported by F. B. Adamstone, of the University of Illinois, to the *American Journal of Cancer.* The results obtained by Mr. Adamstone apply only to chicks and to one type of tissue. They are, however, significant and may furnish an important clue to the cause of at least one type of cancerous disease. When the chicks were fed for prolonged periods on a diet normal in all respects except for its complete lack of vitamin E, all the chicks died, some of them suddenly, others after an illness. Examination after death disclosed the growth of new, cancer-like tissue which was destroying the normal tissue of liver, heart, pancreas, gizzard, spleen and lungs. The tumors belong in the class known as lymphoblastoma and appear very much like the tumors found in typical cases of leukemia in the fowl, though Mr. Adamstone makes no claim that the two conditions are identical.

BALLOONS carrying robot radio mechanisms that signal back to earth the weather aloft may soon be used regularly to replace the present upper air airplane observations when weather makes flying impossible. For the first time the radio meteorograph record has taken the place of the weather airplane in gathering U. S. Weather Bureau reports. The weather was too bad for an airplane ascent. The Harvard Blue Hill Observatory let loose a radio meteorograph in dense fog, rain and northeast wind and obtained a record to 30,000 feet. The radiometeorograph showed that the cloud from which the rain was falling extended up to 7,500 feet and that the temperature was below freezing above 5,000 feet. A second cloud layer 600 feet thick was encountered at 10,000 feet. Above this the air was quite dry indicating clear skies and excellent flying conditions. At 25,000 feet aloft the temperature was 36 below zero.