SCIENCE NEWS

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ECLIPSE EXPEDITIONS

SEVEN times has Professor John A. Miller, of Swarthmore College, traveled from his home to Connecticut, to Mexico, to Sumatra and to other parts of the world to observe an eclipse of the sun. And seven times has he seen the dark disc of the moon creep across the sun, then the corona suddenly flash out for a few minutes, only to disappear just as suddenly, with the sun reappearing. The last one he saw was on May 9, thus making him undisputed champion. No other astronomer has seen as many, though one has been to nine and another to eight.

Professor H. D. Curtis, of the Allegheny Observatory of Pittsburgh, who accompanied Professor Miller on his recent trip to Sumatra, as he has on previous expeditions, has been to the most, for the last was his ninth. But three times he has had cloudy weather, and was unable to make any observations. The president of the University of California, Dr. W. W. Campbell, has been to eight eclipse tracks. However, on two occasions he has had clouds make his trips in vain. Thus he has seen six, like Dr. Curtis. Professor S. A. Mitchell, of the University of Virginia, has been to seven. But on his last expedition, to Norway in 1927, he had cloudy weather, so that he has also seen six. One government astronomer, Professor G. H. Peters, has been to six, none of which have been completely clouded, though some have been clearer than others.

Professor Miller's good fortune in Sumatra may result in providing one of the two checks of the Einstein theory of relativity at the May, 1929, eclipse. At least five expeditions, German, British, French and American, planned to make such observations to see whether the position of the stars in the sky is affected by the proximity of the sun. Einstein says that they would be affected, and has the measurements of two previous eclipses on his side.

Apparently the only two of the expeditions that essayed this experiment that had clear weather were those of Professor Miller and of Dr. Walter Baade, from Hamburg, Germany, in Cebu, one of the Philippine Islands. At Alor Star, in Kedah, and Pattani, in Sumatra, where two British expeditions were located, clouds seriously hampered the observations.

Professor Miller's success, with the eclipse occurring right in the center of a perfectly clear spot, is especially fortunate, because of his cooperation with the Naval Observatory party at Iloilo, in the Philippines, which was also successful. At both places identical cameras, 62 feet long, giving an image of the sun 7½ inches in diameter, were used. The same kind of plates, and exposures of the same duration were made at both places. This was the first time that such an experiment had been tried, and as the eclipse occurred at Iloilo about an hour later than at Sumatra, the two sets of plates should show how rapidly the corona moves.

The rest of the Naval Observatory party's photographs were quite successful, despite thin cirrus clouds, it was found after the plates had been developed. Dr. R. L. Waterfield, who was located near-by, was not so fortunate. After developing his plates he found that the clouds had greatly impaired them.

Undoubtedly important results concerning the Einstein theory, as well as other scientific ideas, will come from these eclipse plates, but not before many months. Not until they return to the safety of their observatories will the astronomers begin their exhaustive examination and measurement. And then these measurements will be the basis of long and laborious calculations. So the attendance at an eclipse is but the beginning of work for an astronomer, and those who had cloudy weather at least have the satisfaction of knowing that they are saved much labor!

EARTHQUAKE MEASUREMENTS

How to measure the severity of an earthquake is one of the chief problems confronting seismologists. This information is needed because engineers, constructing buildings that will be safe against earthquakes, want to know what to protect against. None of the three possible factors, extent of the vibrations, their acceleration or the times between vibrations, is alone satisfactory.

This was the view expressed to members of the Seismological Society of America, meeting at Fordham University with its Eastern Section, by Dr. James B. Macelwane, S. J., professor of geophysics at St. Louis University.

Calling attention to the three criteria that have been suggested, he said, "Which is right? What constitutes destructive intensity? Is it the acceleration alone? It would not seem so, because an earthquake that is evidently of moderate intensity may break windows and do other damage because of the rapidity of the vibrations.

"On the other hand, the period alone can not be a criterion. There must be a sufficient force. Stanford University has built a massive shaking table in the manipulation of which these various factors can be controlled. A thorough investigation of the problem of destructive intensity awaits the use of some such apparatus for its solution."

According to computations by European earthquake students, there is a discontinuity of some kind in the earth's crust about 37 miles below the surface, in Europe.

"However, there entered into this computation a very serious doubt," according to Dr. Macelwane, "as we do not know the depth of focus of the earthquakes. In order to eliminate this uncertainty, the records of a number of violent explosions, particularly those at Oppau, Alpnach, Fort Falcanara, La Courtine, and in the quarries of Malancourt and Gargenville, were studied in detail because the energy was released at the surface of the ground and the origin was thus exactly known. The explosion at Oppau was so violent that the elastic earth waves were recorded by seismographs up to a distance of three hundred kilometers."

HORIZONTAL RAINBOWS

RAINBOWS in the sky are familiar to everybody, but, if you are fortunate enough, you may some time be able to see a horizontal rainbow on a calm surface of water. You are most likely to see it following a fog, and, if you are particularly fortunate, you may even see a cluster of several horizontal rainbows.

In the forthcoming issue of the *Journal* of the Franklin Institute, Dr. W. J. Humphreys, professor of meteorological physics at the U. S. Weather Bureau, describes the formation of these strange phenomena, and tells of two people who have seen them in clusters. The bow seems to be right on the surface of the water, and, in the case of the cluster, one appears right behind another.

The cause, says Dr. Humphreys, is a layer of tiny droplets of water, resting on the surface of the body of water, but prevented from merging into it by a thin film of oil on the surface. The sun is back of the observer, and the rays of light are reflected back to the eye by the tiny droplets of water on the surface, just as they are by the drops of water in the sky in the case of the usual rainbow. If the sun is overhead, the horizontal bow appears as a circle. If lower, it is an ellipse, surrounding the observer. If at an angle of 42 degrees above the horizon, it is a parabola, while at a lower angle of the sun it is a hyperbola. All of these curves are what the mathematician calls "conic sections," that is, the curves formed by the intersection of a plane with a cone.

The cluster of several bows is formed by reflections from the actual surface of the water, as the sheet of droplets may not be quite in contact with the water surface.

TRACES OF NICKEL IN FOODS

TRACES of nickel have been found in several human foods by Professor Hans Kaufmann and Professor Oskar Keller, of the Pharmaceutical Institute of the University of Jena. The amounts are expressible only in millionths of a per cent. by weight, but may be of medical significance, since nickel is usually considered an element deleterious to human health, which must be eliminated from the system. However, if minute amounts of certain metals are needed by all animal tissues, as some chemists claim, this may be the source for the body's nickel supply.

The two German chemists were led to their researches by the question of the possible harmfulness of nickel in margarine. This food fat is made by passing hydrogen through vegetable oils, in the presence of finely divided nickel which serves as a catalyst, or chemical matchmaker, to secure the union of the hydrogen and the oils. By testing high-grade margarine with the most delicate of known chemical methods, percentages of nickel from five ten-millionths to one millionth by weight were detected.

But when the experimenters turned their attention to butter, they were surprised to find that good grades of this product contained more nickel than was in their margarine samples. They then analyzed various fodders eaten by cows, and again found nickel.

The highest concentrations of nickel in plants were found in the legume, or pea family. Peas and beans showed percentages as high as two hundred-thousandths.

POISON IVY

GREEN leaves are on the poison ivy again, and at least some outings are bound to have unhappy after-effects. Chemists and botanists, however, unite in declaring that there is no longer any need for susceptible individuals to suffer hours of itching agony from a luckless contact with the evil weed. There are several very simple remedies, made of common, non-proprietary chemicals, that will banish ivy poisoning in almost 100 per cent. of all cases.

A preventive recommended by Dr. James B. McNair, of the Field Museum of Natural History, Chicago, is a five per cent. solution of ferric chloride in water, or in a mixture of water, alcohol and glycerin. This is to be washed on all exposed skin surfaces before going into the woods, and allowed to dry without wiping. The thin deposit of iron salt neutralizes the ivy poison immediately upon contact. This remedy has been in use by the botany classes of the University of Chicago for several years, with very good results.

For persons who have had the ill luck to become poisoned, Dr. James F. Couch, of the U. S. Department of Agriculture, recommends a wash of a three per cent. solution of potassium permanganate. This oxidizes the poison, and healing follows rapidly. This remedy leaves the skin brown, but the stain may be removed with a one per cent. solution of oxalic acid. Any of these remedies can be mixed by any druggist, without a prescription.

Poison ivy is really a misnomer, for the plant is not related to the common ivy. It is a sumac, and closely related to the even more vicious poison sumac that grows in our bogs. Poison ivy can be recognized easily by the three-parted leaves, which have given rise to the old saying: "Leaves three, let it be!" The plant may either climb trees by means of aerial roots that cling to the bark, or it may creep along just under the surface of the soil, sending up thickets of short, woody shrubs from a foot to three or four feet high. In this latter form the plant is sometimes called "poison oak," but that name is incorrect; it belongs by rights to a related shrub of the Pacific Coast.

Poison sumac troubles fewer persons than poison ivy, but those who are susceptible get hit harder. It is perhaps providential that this shrub grows only in acid-water bogs or on their borders, where only botanists or determined hikers venture. But where a road has been built through boggy country even automobilists will sometimes come to grief from it. It looks very much like ordinary sumac, but can be distinguished by its pale gray bark and its drooping clusters of white berries.

The "lacquer poisoning" with which some persons occasionally become afflicted is a form of ivy poisoning. Oriental lacquers are made from the gummy sap of a species of sumac that is related to the poisonous American species.

BLOOD GROUPS

WHAT the chances are of establishing a child's paternity by blood grouping tests has been worked out by Dr. Sanford B. Hooker and Dr. William C. Boyd, of the Evans Memorial for Clinical Research and Preventive Medicine, Boston. This method is becoming increasingly popular for settling disputes concerning paternity in bastardy proceedings. It is often desirable that the alleged father should know the probability of his being exonerated by the results of the blood grouping tests.

Human blood is divided into four groups according to certain properties of agglutination. A relatively simple test shows to which group a sample of blood belongs. The probability of establishing non-paternity is one to five for group 4 (Moss grouping), one to 17 for group 2, one to seven for group 3 and one to two for group 1. These probabilities are based on the frequency distribution of the groups among the white population of the United States and upon the laws governing inheritance of the factors that determine the blood groups.

When blood from two persons of the same group is brought together it will mix freely, but if blood of two different groups is brought together, the cells will clump. This clumping is called agglutination. To find what group a person is in, a sample of his blood is matched with samples of blood from known groups. Microscopic examination shows whether the cells are clumping or mixing freely. From the action of the unknown blood with each of the known bloods the group of the unknown blood can be worked out.

There are three methods of determining blood groups, each having different terminology and technic. Drs. Hooker and Boyd have worked out the probabilities for each of the three ways of grouping blood.

The fact that the blood of a child will be in the same group as that of one of its parents has been used lately to determine the child's paternity. If the child's blood is the same as that of the mother, paternity can not be definitely established, as he might have inherited his blood group from his mother. But if the child's blood belongs to a different group from those of the mother and of the alleged father, it has been taken by some courts to prove non-paternity on the part of the alleged father. Some authorities hold that it is not so simple as that, and that blood group as a characteristic may be inherited from grandparents as well as parents.

A CENSUS IN MEXICO

PREPARATIONS are now being made by the Mexican department of statistics for the most thorough census in the history of the country, to be taken in 1930.

Previous censuses have only counted the population, but this one will be industrial and agricultural as well, a factor that will be of great advantage to the country in the shaping of its internal policies, and of interest to foreigners who are seeking trade channels or desirous of founding industries there.

One of the curious anomalies of Mexico is that all the great industries for which the country is noted, such as the production of gold, silver, oil, sugar, cotton and the like, are foreign owned, and it has been said by critics that Mexico has no industries of its own. The present census will reveal the conditions in the minor industries, so important in the economics of the country, but unorganized and heretofore unrecognized. Many of these smaller industries are Indian, a survival of native business from before the Conquest.

Great sections of rural Mexico make practically everything they need. Native potters make the kitchen utensils, women weave cloth from ixtle fiber, cotton, or wool from the sheep and goats they raise. Charcoal is burned from wood all over the country by Indians, and sold to whites and natives alike, as it replaces the coal of other countries.

Indians weave their own hats, tan hides for sandals, raise their corn, beans and chili, make the adobe bricks for their houses and even their own fire-crackers for their fiestas. In many sections of the country the products of modern industries are not used.

Although some of the products of native industries have entered foreign trade, when the beauty of the wares has attracted the attention of tourists, as in the case of pottery, hats, sarapes, lacquered ware and other objects, they have had no place in industrial registers and have been unrecognized officially before to-day.

ITEMS

FIRES caused by static electricity generated by moving belts of machinery have become so frequent that the chemical engineering division of the bureau of chemistry and soils of the U. S. Department of Agriculture is conducting an investigation to develop coating preparations for belts which will ground such charges of electricity. Preliminary work has shown that belts coated with preparations having a sufficient quantity of lampblack conduct static charges harmlessly to the ground. Rapidly moving belts that drive machines may become highly charged with electricity and give off sparks under certain conditions, particularly if the air is dry. This causes a considerable fire hazard especially in industries where inflammable dust or vapors are present. Ordinary leather and rubber belts are practically non-conductors of electricity so that there is no chance for the static to escape. Experiments were made in coating the belts with preparations of lampblack, spar varnish and other mixtures, and several formulas have been developed which greatly reduce this fire hazard.

THE last of the heath hens is living on Martha's Vineyard, where at one time its species abounded. The sudden depletion in the number of these game birds about fifteen years ago attracted the attention of scientists and thousands of dollars were spent in an attempt to protect them. Even as late as 1916 there were about 1,000 heath hens known to be on the island reservation, and fears of their extinction were allayed. Then, just at the time the hens were sitting on their eggs, a disastrous forest fire swept over the area, losing the year's hatch and in addition many of the females. In addition they acquired some of the common poultry diseases. Two years ago ornithologists were able to find only 30 specimens on the island, which in a year were reduced to nine, a little later to three, and then to two. Now but the one can be located, on the farm of James E. Greene.