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THE ECLIPSE OF APRIL 28

ASTRONOMERS in the air above and on the earth below will watch the eclipse on April 28, along a path crossing California. Even though the eclipse at best will only last about a second and a half, elaborate preparations have been made to observe it. In addition, thousands of sightseers will journey to the half-mile-wide path to see this most impressive of all natural phenomena.

The time being so short, some of the usual eclipse observations will not be possible. Astronomers often travel half way around the earth to watch an eclipse, but it is probable that if this one were in Kamchatka or Timbuctoo they would pay little attention to it because it would hardly be worth the trouble and expense required to observe it. But as it occurs in California, within a few hundred miles of two of the world's greatest observatories, its observation is imperative. Were they to neglect an eclipse so near home, it might be difficult to get funds when there is an eclipse expedition to a more distant place in prospect.

However, valuable observations will be possible at this eclipse, despite unfavorable conditions. The corona, outermost layer of the sun, is visible only at a total eclipse and must be observed at every possible opportunity. A long exposure photograph, of many seconds, will be impossible, but a brief exposure will reveal its brighter features. With the path of the eclipse so narrow, and an uncertainty as to its exact position, of perhaps an amount equal to its width, there is a danger that a camera placed in the expected path might actually be outside. Ordinarily, when the path is a hundred or more miles wide, an uncertainty of a half mile or so at the edge is not serious.

On account of this, the astronomers from the Lick Observatory, at Camptonville, in Yuba County, under the direction of Dr. J. H. Moore, will have three corona cameras. One will be placed in the center of the predicted path, a second a third of a mile to the north and the third an equal distance to the south. Then if one camera misses, another would probably get it, and a valuable record will be obtained.

Near the Lick party will be a private group, under the direction of Dr. R. L. Waterfield, of the Johns Hopkins University. They will also try corona photographs. Farther north, near Honey Lake, in Lassen County, will be a party from the Mount Wilson Observatory, under the direction of Dr. S. B. Nicholson. Near-by will be Mrs. Isabel Lewis, as unofficial representative of the U. S. Naval Observatory, who will also try for corona photographs.

Circling overhead at various parts of the path will be army and navy airplanes, making photographs of the eclipse. Dr. Hamilton M. Jeffers, of the Lick Observatory, will fly in an army airplane from Crissy Field, San Francisco, while a group of naval planes will operate in the Honey Lake region. Besides photographs of the eclipse, they will try to photograph the shadow of the moon on the earth below. Such pictures, if they can be made at all, can probably be made even if the airplane is not in the exact path, but a little outside of it. With the slight uncertainties of navigating an airplane several thousand feet high along a precise path added to the uncertainties of the path itself, these aviators have a good chance of missing the eclipse. But with a fleet of planes, flying along a path a mile wide, one or two are pretty sure to succeed.

There is one eclipse observation, however, that will be made from the ground that is not dependent on the length of the eclipse. Just before or just after the sun is completely covered by the moon, the reversing layer, the outermost part of the sun as we ordinarily see it, can be observed by itself. The solar spectrum at such an instant appears as a series of bright lines, instead of the usual continuous colored band crossed by dark lines. This is called the flash spectrum. As it can only be observed at the beginning or end of a total eclipse, the duration is of little importance, and so this eclipse is just about as good for it as any other. Indeed, the flash spectrum is the chief justification for the eclipse observations. Efforts to record it will be made by the parties from the Lick and Mount Wilson Observatories, Dr. Waterfield's group and also by a group near Gerlach, Nevada, headed by Dr. Heber D. Curtis, director of the Allegheny Observatory at Pittsburgh.

Even outside the path of totality there will be some observations. At the Lick Observatory the eclipse will be about 98 per cent. total, and it might even be possible to secure a flash spectrum picture there. At the Students' Observatory of the University of California, in Berkeley, it will be still more nearly total and similar observations will be made.

WAVES AND PARTICLES

ONE of the outstanding puzzles of modern physics—how electrons, once thought of as material particles, can behave sometimes like waves while "waves" of light sometimes behave like particles—was discussed at a recent meeting of the American Philosophical Society in Philadelphia by Dr. C. J. Davisson, of the Bell Telephone Laboratories. One result has been that the physicist no longer tries to imagine a model of every physical phenomenon.

"The theoretical physicist has outgrown the ambition of Lord Kelvin," he said. "He no longer tries to devise a mechanical model of every phenomenon. It has been discovered, in fact, that a certain esthetic pleasure is derived from dealing in calculations with symbols which evoke no mental picture whatever. In certain quarters a fetish has been made of this mental attitude."

Describing his own experiments, Dr. Davisson told how a stream of electrons aimed at the face of a crystal had behaved much as light does striking a mirror—most of

them had been shot back at the same angle to the surface layer of atoms as they had approached.

"There is a strong and well-defined beam of regularly reflected electrons. This is a phenomenon which is not predicted and can not be explained if we insist on assuming that electrons are solely corpuscles much smaller than the individual atom, for to such corpuscles the surface of the crystal must appear not as a smooth plane, but as a rough and broken field.

"Picture the crystal built up of atoms, each of them enormous in size compared to an electron and each of them comprising a nucleus surrounded by a larger number of electrons rotating in closed orbits. Imagine now an electron plunging into this galaxy of planetary systems. It is obviously a comet. The simplest event which may ensue will be a comet-wise deflection of the electron in the field of some atom into which it happens to strike, and then a speeding away of the electron from the crystals without loss of energy. The direction taken by the departing electron would be determined by a number of circumstances, one of which would be the distance of the line of approach of the incident electron to the nucleus of the atom responsible for its deflection.

"If we regard the beam of incident electrons as a beam of waves instead of as a stream of particles," he continued, "then each wave-front of the beam comes in contact with all the atoms of the surface, and the regular reflection is explained, as in the case of X-rays, as the result of constructive interference among the coherent secondary wave trains scattered by and proceeding from the regularly arranged atoms of the crystal."

Dr. Davisson also explained other similarly paradoxical experiments. "Whether or not it is possible to achieve a unified conception of electrons in which these newly discovered wave properties appear consistent with their longer known corpuscular properties, or whether such an achievement is beyond the limits of thought is a matter which does not worry the experimental physicist so much as might be supposed. It used to be said that a physicist regarded light as a wave phenomenon on Mondays, Wednesdays and Fridays, and as a corpuscular phenomenon on the other days of the week. This statement must now be extended to include electrons, and modified, I think, to state that he regards light and electrons as both waves and particles on all days of the week. And it might be added that familiarity with this duality of properties is dulling his sense of its paradoxical nature."

FURTHER INVESTIGATIONS OF PARROT FEVER

THE U. S. Public Health Service's investigation on psittacosis, or parrot fever, which has been suspended for a month on account of sickness of many members of the Hygienic Laboratory staff who contracted the disease, will be resumed shortly at the Baltimore Quarantine Station, just outside the city of Baltimore, as announced by Surgeon-General Hugh S. Cumming.

Dr. George W. McCoy, director of the Hygienic Laboratory, and Dr. Charles Armstrong, who had been conducting the investigations until he fell a victim to the disease, are now making arrangements for the resumption of the work in the new location. The removal of this part of the Hygienic Laboratory's work was made on the recommendation of a special committee appointed by the surgeon-general to study the situation after eleven persons working at the laboratory had been stricken with the disease.

The fact that most of those who became ill had not been anywhere near the rooms where the psittacosis studies were going on, and had no contact with the infected parrots or with the cultures of the germs suspected of causing the disease, has added to the mystery and to the dangerous element of this particular disease.

The question of a carrier state was brought up in this connection, and will be investigated when the work is resumed at the Baltimore Quarantine Station. A virus which was obtained just before the work was suspended is thought to be the cause of the disease. Confirmation of this will be part of the work. The susceptibility of other species of birds and animals to this disease which attacks both man and parrots will also be studied.

At the time of suspending the parrot fever work, the entire Hygienic Laboratory was carefully fumigated. All the birds used in the studies were destroyed, but cultures of the virus have been preserved and will now be studied.

"RUSH" TREATMENT FOR HAY-FEVER

JUST when the tiny pollen grains from early-blooming trees are causing the season's first sneezes and sniffles among early hay-fever sufferers, comes word from London of a new and speedy method of treating these unfortunates. The method is appropriately called "rush" desensitization by its author, John Freeman, director of the department of clinical bacteriology at St. Mary's Hospital, London, in his report of it to the *Lancet*.

Earlier methods of treating hay-fever victims have been leisurely, Mr. Freeman pointed out. The treatments were begun long before the hay-fever season started, and were given once a week for a number of weeks. When treating sufferers for whom there was no off season, because their attacks were due to some constant irritant, such as hair or dandruff from a pet cat, dog or other animal, Mr. Freeman developed a more intensive method of treating the patients every day with gradually increasing doses of the desensitizing vaccine.

He finally developed the "rush" method which can be put through in from two to four days. The treatments are given every one and a half or two hours throughout a 14-hour day. The patient either goes into a hospital for them or has a trained nurse at home who can give the treatments and watch his condition carefully.

The first step in hay-fever treatment is to determine what plant or tree pollen or animal or food protein causes the trouble in the individual case. Some persons are sensitive to more than one such irritant. When the offending pollens and other proteins are discovered, they are injected into the patient in tiny but gradually in-

creasing amounts until finally his system has become desensitized to them and can tolerate them in the amounts usually present in the air of his environment.

PATENTS ON PLANTS

By the terms of a bill now on the calendars of both House and Senate the originator of a new plant variety may apply for and receive a patent on his product just as if it were a machine or a chemical formula. The protection thus to be extended, however, will apply only to plants that can be propagated by asexual or vegetative means; seed-propagated plant varieties, even if new, are not included. A further exception is made in the case of plants propagated by tubers, because of the strong opposition of growers of certain classes of field crops.

A bill to give plant breeders patent protection has long been desired by horticulturists, among them the late Luther Burbank. As things stand at present, the originator of a new and valuable plant variety can reap a reward for his labor only by selling his first small stock of plants at a high price. Occasionally a good-sized fortune will be paid for a half-dozen strawberry plants, but this is a rare exception; usually the plant originator gets little or nothing. And even when he has been shrewd enough to build up a high bid for his little monopoly, the first price is all he ever receives. In a few years the plant is anybody's plant, like a patent-expired invention. It is to remedy this situation that the present legislation has been proposed.

The field covered by the proposed law is very wide. Among patentable plants will be new varieties of practically all fruit and nut trees, such as apples, oranges, cherries, pecans and walnuts; most small-fruits, including grapes, raspberries, strawberries and blueberries, and many ornamental shrubs, vines and perennial herbs, like roses, lilacs, wisterias, phloxes and peonies. Most field crops are unaffected, because they are seed-propagated or tuber-propagated.

Both Thomas A. Edison and Mrs. Luther Burbank have wired to Congress their endorsement of the bill. Edison states: "Nothing that Congress could do to help farming would be of greater value and permanence than to give to the plant breeder the same status as the mechanical and chemical inventors now have through the patent law. There are but few plant breeders. The bill will, I feel sure, give us many Burbanks." Says Mrs. Burbank: "Have just received welcome news of congressional activity looking to protection of plant breeders and producers of new fruits by patent. As you probably know, this was one of Luther Burbank's most cherished hopes. He said repeatedly that until the government made some such provision for insuring experimenter or breeder reasonable protection, the incentive to creative work with plants was slight and independent plant breeding would be held back to the great detriment of horticulture."

Commissioner of Patents Thomas E. Robertson stated that the amount of extra work which may be involved in administering the new class of patent claims has not yet been estimated by his office. For this reason, the bill as it stands carries no special funds for administration, but these will be asked for as needed. The bill provides that the Patent Office may receive the assistance of qualified plant scientists in the Department of Agriculture in passing judgment on the claims of applicants. The bill will not be retroactive if it becomes law. Plants that have been in public use for more than two years will not be subject to patent.

ITEMS

Two fragmentary human skulls, together with bones of two skeletons of prehistoric man, have been unearthed in Algeria by the Beloit College-Logan Museum expedition under Dr. Alonzo Pond. Thirteen student workers and 16 Arabs have started excavations at a site 12 kilometers north of Ain Beida and east of Berriche. Lauriston Sharp and John Gillen, both University of Wisconsin students, have come upon parts of an adult skeleton and the bones of a child about six years of age. The bones were found in an undisturbed section of a shell heap, which gives evidence that the individuals were as old as the deposit in which they were found. Numerous flints and some animal remains have been uncovered. Robert Kreiger, a Beloit student, found a human radius which had been used as a flaking tool.

Physical measurements have been made of over 6,000 old Virginians of both sexes between the ages of 6 and 60 years by Professor Robert Bennet Bean, of the University of Virginia. "The stature and leg length of the men and women are greater than for the majority of European peoples," Professor Bean reported at the recent meeting of the American Association of Physical Anthropologists. The tallest were the men of the group of planters, or gentlemen farmers, from Albemarle County, whose average height was approximately 5 feet, 11 inches. Next tallest were the group of men students.

Methods by which diameters of stars have been measured have been applied to the measurement of terrestrial distances with very high precision by Stuart H. Chamberlain, at the Michigan State College. In a report to the American Physical Society, he describes the method, which makes use of the interference of light waves. When a beam of light is separated into two parts and recombined under the proper conditions, a series of light and dark bands results, called interference fringes. Variation of as much as a small fraction of a wave-length of light in the distance traveled by one of the parts causes a perceptible shift in the bands. In the instrument developed by Mr. Chamberlain, a parallel beam of light is divided into two parts which, slightly separated, converge towards a mirror at the distance to be measured. This reflects them back to the observer, where they are combined by a prism and the fringes are seen in a telescope. Counts of the numbers of the dark bands tell the distance between the light source and the mirror.