SCIENCE NEWS

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THE PERSEID METEOR SHOWER

MANY amateur astronomers will aid the professionals who study meteors this month by watching the skies for shooting stars of the Perseid shower. They come in largest numbers about August 11, though the entire month of August is a good one in which to see these missiles from space.

These meteors are tiny things, generally no larger than grains of sand, yet hundreds of millions of them reach the earth's atmosphere daily. Friction with the air heats them to such an extent that they burn in a flash of light, called a "shooting star." Of course, they have nothing to do with the stars, as the ordinary meteor is visible while 50 to 75 miles above the ground.

Meteors seen ordinarily are sporadic, but there are several definite swarms which move around the sun in regular orbits. When the earth crosses one of these swarms, as it does about August 11, meteors are far more numerous. Then one a minute, or even more, is visible. Sporadic ones may come from any part of the sky, but those of the showers appear to radiate from a single direction. This is an effect of perspective. Actually, the meteors are moving in parallel paths, and these converge, like railroad tracks, in the distance.

In the case of the August meteors, this convergence is in the direction of the constellation of Perseus, which rises late in the evening to the northeast. Therefore, they are called Perseid meteors. Meteors are always more numerous after midnight than before, since then we are on the advancing side of the earth, and meet them head-on. During the evening only those which can catch up to us are visible.

Dr. Charles P. Olivier, director of the Flower Observatory of the University of Pennsylvania, at Highland Park, is one of the leading authorities on the subject, and is always glad to receive reports of amateur observations. A useful, yet simple, observation is to count those seen over half-hourly periods, as from midnight to 12: 30, 12: 30 to 1: 00, 1: 00 to 1: 30, etc. The times of any particularly brilliant meteors should be noted, and this information, together with an accurate statement of the observer's position, should be sent to Dr. Olivier.

Observers are especially favored this year because the moon will be just past first quarter on the eleventh, setting about midnight. Thus, its glare will not interfere, as it would if it were full at the time.

JUPITER AND SATURN

THE beginning of a rare and complicated step in the movements of the planets, during which Jupiter will pass Saturn three times in six months, will occur on August 15. The last time such a maneuver was seen was in 1682 and 1683.

Astronomers call this a "triple conjunction." It is an effect of the motion of the earth around the sun, at a speed of 18.5 miles per second. Jupiter, farther out from the sun, travels more slowly, only eight miles per second, while Saturn plods along at about six miles per second. Once a year, as we overtake these planets, they seem to go backwards, or "retrograde," in the same way that a slow freight train seems to be going backwards when you pass it in a fast express.

At the present time, both Jupiter and Saturn, which rise soon after midnight, are traveling in their direct motion, from west to east. Now Jupiter, brighter of the pair, is to the west, but on August 15, at 8: 00 A.M., Eastern Standard Time, he will pass his fainter brother. They will be separated by about two and half times the apparent diameter of the full moon.

On August 27, as the earth catches up to Jupiter, he will seem to stop, after that will retrograde, moving to the west. On September 4, Saturn likewise will stop, and turn back. Then, on October 11, Jupiter will again pass Saturn.

By December 31, we will have moved far enough along that Jupiter will again seem to stand still, and then start moving east once more. After January 10, Saturn will resume his direct motion. On February 20 the third, and final, conjunction of the series will take place. In the fall of 1941, the two planets will again move to the west, but this time, Jupiter will not reach Saturn.

About nineteen years from now, Jupiter will again pass Saturn, but then only once. While the planets will retrograde at that time, as they do every year, this backward motion will not occur at the right time to cause a triple conjunction.

A famous triple conjunction occurred in 7 and 6 B.C., about the time of the birth of Christ. It has been suggested that this was one of the strange happenings in the sky observed by the Wise Men, that have come down to us as the "Star of Bethlehem."

THE ROTATION OF THE MILKY WAY

PHOTOGRAPHS made over a four-year period beginning in the year 2015 will be required to complete a research program to measure the rotation of the Milky Way, which will start soon at the Lick Observatory of the University of California.

A new $65,000 star camera, making exposures on plates 17 inches square, will be used, according to Dr. W. H. Wright, director of the observatory. The 16-ton mounting for the camera, arranged to turn as exposures are made, thus compensating for the earth's movement, is now in place. Eventually it will have two lenses, one to photograph in blue and ultra-violet light, the other in yellow light.

However, the European war will delay indefinitely the completion of the former, since the glass discs of which it is ground were ordered from abroad. The glass for the latter arrived just before hostilities began, and is being ground to the right curvature. For the present this one will do double duty.

Every clear night, after the lens is in place, photographs will be made, overlapping pictures of the northern part of

the heavens. Four years, it is estimated, will be required to complete the work. Seventy-five years from now, the series will be repeated, and comparison of the two sets of plates will show the rotation of the Milky Way.

The sun, as well as the stars we see, is part of the Milky Way system, or Galaxy, and partakes of this rotation. These stars are arranged in a great cluster the shape of a grindstone. We are inside, when we look to the edge of the grindstone, we see a much greater concentration of stars than when we look to the side. This concentration is the Milky Way. The grindstone is about 100,000 light years (600,000,000,000,000,000 miles) in diameter.

Stars nearest the center turn fastest. We are about two thirds of the way out from the center, and at that distance take about 220,000,000 years to make one circuit. Long though this is, the distance is so great that we are traveling at a speed of approximately 170 miles per second to make it. These figures will be known much more accurately in 2019, when the Lick Observatory program is completed.

Incidentally, the new star camera has many other uses, and will not be placed in retirement in the interval.

CHRONOMETERS FOR THE NAVY

SHORTAGE of chronometers—accurate marine timekeepers—which has led the U. S. Navy to reduce the number on battleships from the usual three to two, is not as serious as it might have been at the time of the last war.

Radio time signals in recent years have increased both in accuracy and number to such an extent that a navigator could now operate satisfactorily with no timepiece but a dollar watch. Twenty times a day, on a number of different frequencies, signals are broadcast from the powerful Navy radio stations at Arlington, Virginia, Mare Island, California, and other locations. Thus, even a relatively poor clock or watch can be checked frequently and its error determined.

These time signals originate at the Naval Observatory, whose superintendent, Captain J. F. Hellweg, invented the transmitting clock which has made possible such accurate time signals, usually precise to within a hundredth of a second or less. This clock can very rapidly be checked and set by comparison with the standard clocks, kept in an underground vault at constant temperature and pressure. The actual transmission is controlled by a vibrating quartz crystal, similar to those used to keep radio stations operating on the proper wave lengths. Similar clocks, adjusted by the signals from Arlington, are used at distant stations.

Though many chronometers have been imported from England, Switzerland and Germany, good ones are also made in the United States. There are many in private hands, and, if the shortage became serious, these could doubtless be obtained by the government.

The chronometer is needed to find a ship's longitude. Latitude can be found by observing with a sextant the sun's height when it has its greatest altitude—that is, at "high noon." But to get the longitude, the navigator must find his local time and compare this with the time at some fixed point, usually Greenwich, the British national observatory. If he is west of Greenwich, his time is earlier, if east, it is later. The difference tells him the distance he is east or west.

Chronometers carry Greenwich time, and the local time can be found by astronomical observations in one of several ways. Most ships in the past have carried three chronometers. If there were only one, it might stop. With two, an awkward situation might arise if they differed, for no one could tell which was correct. But with three there is greater safety, for not more than one is likely to be seriously in error at a time.—JAMES STOKLEY.

THE DANDRUFF GERM

THE mystery of the cause of human dandruff is still unsolved, despite the willingness of an investigator of the United States Public Health Service to allow suspected germs to be rubbed on his scalp.

With a Scotch verdict of "not proven," the indicated fungus, *Pityrosporum ovale,* is relieved of some of its suspicion. It is concluded that it is due "to a somewhat abnormal physiological condition."

The tests were made by Dr. C. W. Emmons, of the U. S. Public Health Service. The experiment was made on a staff member of the National Institute of Health. He took a chance on getting worse dandruff than he already had by rubbing the suspected germs into his thoroughly cleansed scalp and shoulders. And he did this not just once, but many times. No dandruff scales appeared on his shoulders. Dandruff did not appear any sooner on the parts of his scalp where the germ had been rubbed than on other parts that had been cleansed and left alone as control areas.

The reason for using a dandruff victim for the tests was that the suspected germ is almost universally present on the human scalp, with or without dandruff. The tests had to be made on someone known to be susceptible to dandruff.

The germ which has long been suspected of playing a part in causing dandruff, because it is found on dandruffy scalps, is a fungus named *Pityrosporum ovale.* Pitiful may describe the condition of scalps on which *Pityrosporum* is found, but the fungus gets its name from a Greek word meaning "bran." It also travels under the alias of "bottle bacillus," which again may be somewhat misleading to the layman. It is merely descriptive of the shape of the fungus, and has nothing to do with any bibulous proclivities on the part of either the fungus or its victim.

The drinking habits of the "bottle bacillus" are unrecorded, but its food habits are known. This is what led Dr. Emmons to his investigations. Not until he had found the fatty diet that the fungus would thrive on did he turn to the question of its relation to dandruff. He still says that more proof is needed before one can be sure that this fungus is not the cause of dandruff.

THE NETHERLANDS INDIES

THE Netherlands Indies have been quite unevenly developed by their present owners. Although Java is only fourth in area it is far and away first in development,

with plantations climbing terraces to the very mountain-tops, a huge and hard-working native population, and vast wealth in its highly organized and diversified export trade.

Jack Shepard points out in the current number of the *Far Eastern Survey* that, compared with Java, the other islands in this great archipelago-empire seem backward and neglected. This seeming neglect is not real, however, Mr. Shepard adds, and the lower state of development of the other islands has good and sufficient causes.

None of the other islands is as blessed as Java with wide stretches of rich soil, easy access to the sea, and a large population of willing brown workers. The Dutch-held parts of Borneo and New Guinea, for example, consist largely of rugged, jungle-covered interior uplands surrounded by vast swamps that run down to the sea in impenetrable growths of mangrove. The famed Spice Islands, hotly fought over by Dutch and Portuguese in the sixteenth and seventeenth centuries, have soils so poor and thin that general farming, to support real working populations, is out of the question. In many of the islands, especially the larger ones, the natives are so primitive, and frequently so shy or even hostile, that they could never be trained to plantation work.

Oil is the key product of the "neglected" Outer Islands, as the Netherlands Indies outside Java are called. There is oil on Sumatra, Borneo, New Guinea, Ceram and possibly other islands. Oil is now the chief export of the Netherlands Indies.

Rubber ranks second among the islands' sources of wealth. Greatest rubber plantations are on Java, of course, with Sumatra coming second. There is a very considerable development of small, native-owned rubber plantations in the Outer Islands. More than two thirds of the rubber acreage in these provinces is in the hands of native growers, many of whom are quite modern in their cultivation methods and marketing arrangements.

Tin is an important product, but limited in its occurrence. The entire output of this strategically vital raw material comes from the small islands of Banka, Billiton and Singkep, off the east coast of Sumatra.

ITEMS

EMPHASIZING that good health and high intelligence will make refugee children from England more desirable temporary American residents, the American Eugenics Society, Rudolf C. Bertheau, secretary, is asking its membership throughout the country to give careful consideration to becoming foster parents to such children selected eugenically. "The advantageous eugenic implications of the presence of these children in our midst, even if only for the duration of the war, will depend largely on the physical and mental status of the children. The Eugenic Societies of Canada and Great Britain are taking an active part in this movement. We may feel reasonably assured that eugenic standards will be maintained to whatever degree the American foster parents desire."

THE head-on collision near Akron, Ohio, of a gasoline rail car with a freight train, causing more than forty deaths, calls attention to the fact that less than half of the nation's passenger rail trackage is equipped with automatic block signals. Data indicate that the stretch where the collision occurred did not have the automatic signals, but used manually operated ones. Automatic block signals indicate some distance away whether a train is in a certain block. It is too early to tell whether these would have prevented the Akron wreck, but it seems likely that they would have done so.

JOURNEYING by rocket to the moon, to see the earth eclipse the sun on April 15, 2033, will be the experience of visitors to the Fels Planetarium, Philadelphia, during August, according to F. Wagner Schlesinger, director of the planetarium. The planetarium chamber will seemingly be transformed into a rocket ship, and, as the trip is made, the moon will be seen growing larger and larger. Arriving there, visitors will disembark and see the earth hanging in the sky above the lunar mountains. It will change in phase, as the moon does from the earth. Then, at new earth, the sun will pass behind our planet. The moon will be illuminated with a strange red glow, from a ring of ruddy light around the earth. After a three-week period on the moon, compressed into forty-five minutes, the voyagers will be safely returned to earth.

WITH 1,700 reindeer born this year, Canada's reindeer herds in the western Arctic now number about 6,600 animals. When five years ago reindeer reached Canada's western Arctic after an overland trip lasting five years from the west coast of Alaska, there were 2,370 animals in the herd which had made the trying trip. Since then the herds in the Mackenzie River district have increased annually to the present total. The reindeer were imported into Canada to provide a new Eskimo industry, because the caribou on which the Eskimos had counted largely for food had been driven away with the onward march of civilization to the north. Eskimos have been trained as reindeer herders, and this autumn the second herd will be given to an Eskimo to look after. This will be a herd of 800 animals which will be driven 250 miles overland from the main reindeer herd to the Horton River district.

THE cure of bubonic plague by chemical remedies of the sulfanilamide group is expected as a result of successful experiments with plague-susceptible mice. The experiments, made by Dr. S. S. Sokhey, director, and Dr. B. B. Dikshit, pharmacologist, of the Haffkine Institute, Bombay, India, are reported in *The Lancet*. One of these remedies, sulfathiazole, saved 80 per cent. and 90 per cent. of plague-stricken mice after the disease had reached the most dangerous stage, when the germs had invaded the blood stream. Even better curative results are hoped for when sulfathiazole is used to treat human beings because the disease is much more severe in mice than in men. Sulfathiazole proved, in mouse plague, to be more effective than sulfapyridine or other of the sulfanilamide group of chemical remedies. Results of treatment with sulfathiazole are as good as those obtained with the Haffkine Institute anti-plague serum.