

SCIENCE NEWS

Science Service, Washington, D. C.

THE PONS-WINNECKE COMET

PONS-WINNECKE comet can now be seen with the naked eye. This celestial visitor is now getting closer to the earth than any other comet within the memory of the oldest astronomers. On June 27 it was but 3,500,000 miles away. Cloudy weather has kept the big telescopes of the Yerkes Observatory from being trained on it recently. However, on June 19, Professor George Van Biesbroeck observed it and estimated that it was of the four and a half magnitude. As objects as faint as the sixth magnitude can be seen without optical aid, the comet is now easily visible to the naked eye.

According to Professor E. B. Frost, director of the observatory, the comet was then seen as a diffused patch of light about the size of the full moon. There is a short streamer projecting from it in the direction of the sun, he said, but this is not developing into a tail. On none of its previous visits, at six-yearly intervals, has it been observed to have a tail.

When observed on June 19, the comet was near the bright star Vega, which is nearly overhead about midnight towards the end of June. By June 25 its orbit carries it to the long end of the Northern Cross, visible high in the eastern sky late in the evening. By July 1, it will have moved to a position near the bright star Fomalhaut, in the Southern Fish. This group will be seen low in the southern sky in the early morning at that time. After that, the comet will move far south, and out of the view of observers in the northern hemisphere.

OIL IN THE MUD OF THE SEA

A LONG look ahead in the oil industry is being taken by Dr. Parker D. Trask, research associate of the American Petroleum Institute. Backed by a grant from the John D. Rockefeller fund of the institute, he is sampling sea-bottom muds and sands in order to throw new light on the question of the origin of petroleum.

Dr. Trask's attention was turned to the sea bottom by the fact, long known to geologists, that the supposed source beds of most of the present-day oil fields are marine in origin. Though these were laid down many millions of years ago, they must have had at least the raw materials of oil scattered through them then, which was later concentrated in the pools now being drained.

Samples of sea-bottom muds and sands were taken from shoal waters in two regions, off the coasts of southern California and of North Carolina, and their oil-producing capacity determined by distillation, by burning out everything combustible, and by other chemical and physical methods.

"All types of sediments, from clay to sand, upon distillation produced oil," Dr. Trask reports. "The yield was low, and in general varied in amount with the degree of fineness of the sediments, ranging from a maximum of 2.7 gallons per ton in a clay-silt to almost nothing in a sand. This maximum yield of 2.7 gallons per ton

is but 5 or 10 per cent. the amount obtained from the better grades of oil shale, which run from 30 to 50 or even more gallons per ton."

The work so far carried on is regarded merely as a preliminary reconnaissance, to be followed by more exhaustive research both in the field and the laboratory.

ECLIPSE OBSERVATIONS ON RADIO PROBLEM

EXTENSIVE observations of the influence of the rays of the sun on radio waves were planned for the total eclipse of the sun, when in the early morning of June 29 the eclipse spread twilight over large sections of Sweden, Norway and England.

As is well known the conditions of reception of radio transmission vary by day and night as well as in different seasons of the year. Especially perplexing are the rapid changes at dusk and dawn. The nature of these changes are little known and no certain explanation has been given. According to the most recent hypothesis, the atmosphere contains two conducting layers. One of these is permanent and of immense width, extending upwards from a height of about 50 miles. The other, at a height of 25 to 35 miles, is thinner and formed anew every day under the influence of the ultra-violet rays of the sun. At daylight the latter layer decides the route traveled by the radio waves. Possibly, however, waves of a certain length reach the outer, permanent layer even during the day.

The eclipse creates a border of twilight at both sides of a narrow strip of shadow. The sun rises, disappears and becomes visible again during the short interval of a few hours. The whole period is so brief that the conditions influencing the radio waves hardly have time to undergo any considerable change. The opportunity of making comparative observations and measurements is, therefore, exceptionally favorable. Observations were to be carried on not only within the zone where the eclipse is total, but also at points which are touched by only a part of the shadow of the moon. During the eclipse on January 24, 1925, which was total in New York, such observations were conducted on a large scale and according to a carefully prepared plan. The interesting and in some aspects surprising results achieved at that time were of great value in the further development of the study of wireless phenomena.

On June 29 the Scandinavian and English radio stations were to be operated all night. Exact time signals were planned, as well as certain symbols, the strength and character of which could be recorded by receivers scattered over a large area. Amateur experimenters on short waves were to cooperate two and two across the route traveled by the shadow of the moon. Even the ordinary radio fans were invited to participate, listening in on the usual broadcasting wave lengths.

RADIO AIDS TO NAVIGATION

WAYS in which radio is being used to guide aircraft over Europe will be studied by Dr. J. H. Dellinger, chief of the radio section of the U. S. Bureau of Standards, who is sailing for Europe on July 2.

Commercial aviation routes abroad are becoming well established, and a variety of radio devices are in use. On the London to Paris route, for instance, airplanes carry radio transmitters. Signals broadcast from the air enable direction-finding stations on the ground to locate the plane and to inform the pilot by radio-telegraphy where he is.

Application of radio to commercial aviation is in a formative stage in this country. The Department of Commerce is now just at the beginning of establishing beacon systems. Three types of radio aids have been investigated by the Bureau of Standards. The first is a directive radio beacon which sends out a special type of radio beam by which pilots can follow the designated course in total darkness or fog. The second type is radio telephony from the ground to the aircraft. The third is a system of marker beacons, like mile posts. There are now four aircraft radio beacon stations established or under construction in this country.

Dr. Dellinger will compare standards of frequency or wave length at European radio stations, using a special instrument for measuring the frequencies. This data will be used in connection with the parceling out of frequencies at the international radio conference to be held in Washington next autumn.

NEW ELECTRIC CABLE

A NEW type of electric cable for small currents, such as those used for sounding bells and buzzers and for starting and stopping machinery, has been invented by a Hungarian electrical engineer in Berlin, Oscar Nagy. It does away with the necessity for having push buttons at set points, for if the cable is squeezed at any place throughout its length the circuit is completed and the current does its work. This is accomplished by having the wires woven into a sort of loose braid, separated by an elastic non-conductor, which permits contact when pressure is applied.

Many uses are suggested for the new cable. It is expected to find a large use around complicated machinery, where threatened accidents to either operator or material demand instant stopping. Since it can be operated with feet, knees, elbows, or any other part of the body, its advantage over ordinary types of switches and levers is obvious. Hidden beneath carpets or otherwise concealed, it is expected to be useful in burglar alarm systems. Strung along trenches, or along the sides of naval vessels, it will enable officers to signal to their men from any point, and by rapid successive pressure messages can be transmitted in ordinary Morse code, making it an emergency telegraph system.

An especially interesting safety application is found in its use in mines and quarries, where a fall or slide of rock automatically sounds its own emergency signal.

CALIFORNIA GRASSHOPPERS

THE plague of grasshoppers now threatening the grain region of northern California is made up of insects similar to the plague of locusts that afflicted Egypt in the days of Moses. True locusts are all winged grasshoppers. In seasons favorable for their hatching, they often appear in dense swarms, following a definite line of march, or rather of flight, and destroying every green thing that lies before them.

Officials of the Bureau of Entomology of the U. S. Department of Agriculture have stated to Science Service that while the present California outbreak may be a little more severe than usual, it is by no means an isolated or unusual event. Every year there is more or less of a grasshopper problem in the California grain belt, at about the time when the wheat is in the "dough" stage of ripening. The half-hardened grains seem to represent the grasshoppers' idea of the ideal food.

The grasshoppers hatch in the spring, from eggs laid in the ground during the previous fall. Eggs laid in plowed land are of course exposed to the weather and destroyed; but alfalfa fields normally stand for a number of years without plowing, and these make favorable beds for the hoppers' eggs.

It is emphasized that the report of "seventeen-year locusts," that spreads abroad whenever there is an outbreak like the present one, has nothing whatever to do with grasshoppers. The insects commonly called seventeen-year locusts are really seventeen-year cicadas, and are much more nearly related to squash-bugs than they are to grasshoppers.

AN AZTEC CALENDAR STONE

THE calendar stone of Montezuma and other interesting relics of the ancient Mexican civilization have been uncovered during repairs made on the National Palace in Mexico City which houses the executive offices of President Calles. The objects are now in the National Museum adjoining the palace.

The calendar stone, the largest of the carvings found, is said by Professor Ramon Mena, head of the department of archeology of the museum, to be the votive offering of Montezuma II to the sun in return for having started auspiciously the cycle of fifty-two years beginning in 1507, hardly a dozen years before the coming of the Spanish conquerors and the fall of the Aztec empire. The preceding cycle, beginning in 1455, is represented as having been initiated with famines and other calamities.

On the sides of the huge stone block are the carved seated figures of priests. One, extending offerings, represents the Emperor Montezuma. On the top surface of the stone are symbols of sacrifice and figures of fire serpents. On the back surface are carved symbols representing the foundation of Tenochtitlan, the ancient Mexico City, and its development under the protection of the god of rain and harvest. The front surface represents the sun on the right and Montezuma on the left.

When the Spanish conquerors entered ancient Tenochtitlan, Montezuma was made a prisoner in his own palace. After his death and after the final defeat of the Aztecs

under another leader early in the sixteenth century, the great temple was destroyed and the city razed to the ground. On the site of Montezuma's palace, Cortez built his own, and the present National Palace was enlarged from that. Much of the building material used came from the ruins of Aztec temples, and the relics which have been recently placed in the National Museum were dug from the ancient foundations laid down by Cortez.

QUACK PSYCHOLOGISTS

PSEUDO-PSYCHOLOGISTS, who promise, like fairy godmothers, to turn every-day human beings into fascinating personalities or into great financial successes, are creating large groups of discontented individuals, according to Dr. E. A. Shaw and George E. Gardner, of the Harvard University Psycho-Educational Clinic.

These two clinical psychologists state in a report to the National Committee for Mental Hygiene that "character analysts" and "practical psychologists" are responsible for many of the dissatisfied, badly adjusted cases that come to the Harvard Clinic. Gilt edge promises made to all, irrespective of ability and training, lead individuals to false hopes and discontent with kinds of work for which they are suited. And repeated failures to attain the heights so glowingly described as well within reach can lead an individual to serious mental upsets.

The psychological quack, half informed concerning scientific psychological principles, undertakes in a conference or by lectures, and for no small fee, to advise men and women about their mental and vocational ills. The two Harvard psychologists explain that "these men, we maintain—and their numbers are growing day by day—are a detriment to the mental health of the community. In their doctrines and platitudes there is just enough of truth and of falsity to make them dangerous."

One serious result of the situation pointed out is that the work of the "analysts" becomes confused in the eyes of the public with the work of well-trained vocational advisers and directors of personality clinics who conscientiously and carefully study the individual who comes to them for help and who advise him according to his real possibilities.

ITEMS

IRIDIUM, a metallic element in the same chemical group as platinum, and often used as the tip for fountain pens, is the hardest pure metal, according to tests recently made by A. Mallock, and reported in *Nature*. Molybdenum is the next hardest, with tungsten third. Nickel is the hardest of the common metals as it ranks fifth, the rare metal rhodium coming in fourth. These refer only to pure metallic elements, for some alloys, such as steel with a high percentage of carbon, rank higher than any. The softest of the metals tested proved to be thallium, as it ranked number 24, lead being 23 and tin 22. Gold is 18, silver 15, palladium, which is in the same group as platinum and iridium, 14, aluminum 12, copper 11 and iron 10.

METHANOL, the synthetic chemical replica of wood alcohol which for the past two or three years has figured largely in chemical imports from Germany, is now to be

manufactured in America by a new and wholly American process, as announced by E. I. du Pont de Nemours and Company. Two years of intensive research were required for the development of the new process, but officials of the company are now satisfied that it is commercially practicable, and a plant for large-quantity production has been constructed at Belle, near Charleston, W. Va., by a company affiliated with the du Pont interests. Future construction already planned is expected to take care of the entire American demand for methanol. The process involves the use of carbon monoxid and hydrogen at high temperature and under great pressure.

REDWOOD trees, imported from California and planted in the Gray's Harbor district of western Washington fourteen years ago by one of the large logging concerns of the Pacific Northwest, have proved a pronounced success. As a result, plans are under way to transform large areas of cut-over lands in the Gray's Harbor section into redwood forests. In the fourteen years a redwood tree has attained a diameter of eighteen inches, showing more rapid growth than that of any other variety of tree planted at the same time. The tree also shows every indication of being high-grade lumber stock. Other varieties planted included spruce, fir, pine and red and white oak. Encouraged by these results, the company is undertaking the growing of the redwood trees from seed, and in addition has planted more than 1,000 acres with spruce, fir and pine seed.

HONEY bees are killed by minute quantities of arsenic as used in sprays for fruit trees, and arsenical sprays should not be used while trees and plants are in full bloom, according to Dr. N. E. McIndoo and G. S. Demuth, of the U. S. Department of Agriculture. Such sprays should be used only after ninety per cent. of the blossoms have fallen from the trees, when the poisons are still efficacious and the majority of bees have abandoned the blossoms. Aside from the value of the honey crop they produce, bees are of considerable value in transferring pollens and thus effecting fertilization, and should be protected by horticulturists. The conclusions are the result of several years' study undertaken because of general agitation on the subject.

THE effects of various oils and other paint materials on ultra-violet rays, which have recently attracted much attention because of their newly discovered importance in medicine, have been the subject of study by George F. A. Stutz, of Washington, who spoke before the annual meeting of the American Chemical Society at Richmond, Va. The degree to which the rays are absorbed by linseed oil, the old standard paint vehicle, seems to depend in part on what has been done with it beforehand. Boiled oil absorbs the radiation entirely at the surface, whereas raw oil permits it to penetrate a considerable distance before it is completely extinguished. Oil dried by exposure to ultra-violet light is more opaque to the light afterward than is oil dried in diffuse daylight. Lacquer films, it was found, permitted a considerable penetration of the rays.