SCIENCE NEWS

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THE PONS-WINNECKE COMET

FOR the first time in a number of years a comet will be visible in the night sky a few months from now. The Pons-Winnecke comet, discovered at the Yerkes Observatory on March 3, will be less than four million miles away from the earth on June 26, according to a report to Science Service from Professor George Van Biesbroeck, discoverer of the comet. At that time it will be visible to the unaided eye. It will then be in the constellation of Aquarius, in the southeastern sky about midnight, and directly south about 3:00 A. M. Not far from it will be the bright star Altair, in the constellation of Aquila, the eagle, which can now be seen low in the eastern sky just before sunrise. At present, the comet is in the constellation of Bootes, near the bright star Arcturus, which is now in the southern sky in the early morning hours.

Though the Yerkes Observatory has in its equipment the largest refracting telescope in the world, with a lens forty inches in diameter, the comet was discovered with a much more modest instrument. This is a reflector, in which a concave mirror replaces the convex lens of the refractor, with a mirror only twenty-four inches in diameter. With the greater light-grasping powers of the reflector, however, it is possible to photograph fainter objects with the smaller instrument than can be seen with the big one. The comet was found on photographs made with the reflector, and appeared as a tiny round patch of nebulosity of the sixteenth magnitude. The human eye can not see objects fainter than about the fifth magnitude.

From now on, and for as long as it continues to be visible, the comet will be under the scrutiny of Professor Van Biesbroeck and other astronomers. These observations will be intended to determine the position of the comet accurately so that its future wanderings may be more accurately charted. Since it was here last, six years ago, when it did not approach nearly as close as it will now, it has been subjected to perturbations by the gravitational attraction of Jupiter and other bodies, which are very difficult to compute, and so its exact position on its present return could not be predicted precisely.

Other observations planned at the Yerkes Observatory will measure the comet's brightness, and still others, by means of the spectroscope, which analyzes its light, will determine its composition. The tail, which will appear as the comet approaches nearer the sun, is known to consist largely of carbon monoxide, a deadly gas frequently produced on earth as a product of incomplete combustion of coal or other fuel.

FOSSIL FOOTPRINTS IN THE GRAND CANYON

NEW finds of fossil footprints of extinct animals, indelibly printed on slabs of solid stone, have recently been brought to Washington by G. F. Sturdevant, ranger naturalist of Grand Canyon National Park, and deposited with Dr. Charles W. Gilmore at the U. S. National Museum. One of the specimens is of a greater age than any hitherto discovered at the Grand Canyon, belonging to the Cambrian age, before any four-footed backboned animals had appeared on earth. The tracks are small, sharp prickings in the sandstone, with no trace of toes, and between them trails a sinuous double furrow, as though some part of the animal's body had dragged through the sandy mud. It is probable that the creature that made them belonged to the zoological group now represented by crayfishes, scorpions and insects. The age in years of these tracks is so great that it remains largely a matter of conjecture; thirty-five million years have been suggested as a conservative estimate.

The second slab is only about half as old, belonging to the Pennsylvanian or upper coal-age level. The tracks on this are of an animal with well-developed toes, probably of the group represented by the modern frogs and salamanders. Though distinct from other tracks previously reported from the Grand Canyon, they bear a sort of family resemblance to them.

Dr. Gilmore states that he intends to spend some time at the Grand Canyon during the spring and summer investigating these tracks and seeking for new material.

THE GREAT ELK HERD

THE great elk herd of Jackson Hole, south of Yellowstone National Park, is to receive the benefit of a new program of scientific game management as the outcome of the organization of a commission on the administration and conservation of the elk.

Represented on this commission, whose first session has just closed, are the U. S. National Park Service, the U. S. Forest Service, the U. S. Biological Survey, the General Land Office, the State of Wyoming, a number of outdoor life organizations, and ranching and business interests of the Jackson Hole district. In their discussion they endeavored to bring out all information now available concerning the numbers and state of health of the elk, their pasturage and other feed supplies, their relation to the cattle-raising and other industries of the region, and to lay out the beginnings of a policy for the future handling of the vast game herds.

The present number of elk is estimated as about 20,000 in the Jackson Hole district, which is matched by about the same number in Yellowstone Park itself, the so-called "northern herd." The question of the future of this northern herd was not taken up at the present meeting, but reserved for a future session.

The problems presented by the elk herds differ from those set a generation ago by the bison, because then the question was one of saving a vanishing species, whereas now the difficulty is that the elk are multiplying much more rapidly than their present range will comfortably allow. The present number, 20,000, seems to be the maximum that the range will support, and in severe winters when feed runs short they die by thousands from starvation. The last bad year was the winter of 1919–1920, when fully half the herd perished. But since new

calves tend to add about 25 per cent. to the herd's total number each year, by 1924 the number was up to normal again.

Partially to offset the failure of natural feed, and to decrease the sufferings of the herd in bad winters, various governmental and private agencies raise hay in large quantities. In mild winters this is allowed to accumulate, and when, at intervals of six or seven years, a season of starvation weather ensues, this is distributed by the rangers. In such winters, each elk requires from a third to a half ton of hay during a period of ninety days.

The consensus of opinion of the conference was that the herd should be held to a top limit of 20,000 animals, that appropriate means be sought to dispose of any surplus, and that certain "key" lands now operated as private ranches in the elk country should be purchased and deeded back to the United States.

WASTES IN COTTON, CORN AND PEANUTS

How to put corn stalks, peanut shells and cotton stalks to use is the problem that engineers of the U. S. Bureau of Standards are about to tackle. Congress has appropriated $50,000, available July 1, for an investigation looking toward the utilization of waste products from the growing of corn, peanuts and cotton.

Scientists recall that at one time the seeds of cotton were considered valueless and that now they form the raw material for a vast industry. The grains of corn, except for the relatively small part of the leaves and stalk used for fodder, constitute the only usable part of America's great corn crop, and since the grain represents only about a fifth of the total weight of the corn plant, experts see the possibility of using the stalks and cobs. Various methods of harvesting, collecting and bringing together enough stalks to make utilization possible are being considered. Manufacture of paper, alcohol and other chemical products from the stalks are being considered. A similar problem is presented by the peanut hulls which now constitute a waste by-product of large magnitude.

Warren E. Emley, Bureau of Standards engineer, is now making a survey of the problems and expects to receive suggestions and descriptions of various possible utilizations from those who have ideas upon the problem. He will shortly make a trip into the corn belt states where some experimental work has already been started.

PARAFFIN PROTECTION AGAINST SHIP-WORMS

BLOCKS of wood given a special paraffin treatment have stayed under water along the Atlantic coast for almost two years without being attacked by the ferocious shipworms that swarm in these waters, according to findings made by the Chemical Warfare Service.

The paraffin treatment under test was devised and patented several years ago by Dr. Paul Bartsch, marine biologist of the U. S. National Museum. After recent examination, the protected blocks were replaced in the water so that the endurance contest between the wood and the worms may continue.

Dr. Bartsch's discovery has attracted considerable attention, because of the enormous damage to wooden wharves, ships and houses caused by shipworms, ants, bacteria and fungus plants. The process consists in penetrating all the tissue of the wood with melted paraffin and two kinds of paraffin soluble poisons. Two poisons are used, Dr. Bartsch explains, because suitable chemicals which are deadly to animals fail to destroy plant life, and *vice versa*.

Whether the paraffin armor protects wood indefinitely against land armies is being tested at the Biological Station in Barro Colorado Island in the Canal Zone. Blocks of wood treated with the paraffin process have been kept buried in a white ant cemetery since February, 1924. When the blocks were last dug up temporarily for examination by a biologist at the station, he reported that the wood was still keeping the ants at bay after two and a half years, and no sign of dry rot or decay of the wood had taken place.

MEMORY TESTS ON SQUIRRELS

Do squirrels remember where they hide nuts? Or can they smell a nut hidden in the ground? Or do they sometimes just dig around and find something by chance, because so many squirrels have buried so many nuts in the squirrel neighborhood?

This squirrel puzzle is a live topic among naturalists.

The story of a red squirrel that buried nine nuts in the snow on a house balcony, and that came next day and carefully dug up the nine nuts, one by one, even though a new fall of snow complicated the problem, is told by Dr. A. Brookes Klugh, of Cornell University, in a report to the forthcoming issue of *The Journal of Mammalogy*. This incident, Dr. Klugh says, is proof of the red squirrel's remarkably strong memory for location. In many cases, there is a possibility that the sense of smell may help a squirrel to find hidden objects, he adds, but this time such assistance seems out of the question.

Dr. Klugh has studied red squirrels for eight years, and has watched individual squirrels over periods as long as two years. He says: "Time after time, I have seen a squirrel go by the nearest route to something it has stored, take it out, and eat it."

Observations indicating that squirrels do not "smell out" buried nuts have been made by L. R. Dice, of the University of Michigan, and described in the same journal. A fox squirrel, which came regularly to be fed, was observed over a period of several months. The squirrel was fed in a shallow box on the house porch, and Mr. Dice filled it with sand and buried a number of nuts under the sand. The squirrel came frequently to the box to eat nuts which were left for it on top of the sand. It sometimes dug around in the sand and if a nut were partially buried with one end sticking up in sight, the squirrel would be likely to find it. But it never discovered a single completely buried nut. If no walnuts were in sight, it would hunt about, and leave without its dinner.

"If squirrels do not find buried nuts by use of the sense of smell," he states, "the presumption would be that they remember the place where they have buried each

nut that they find. This would require a well-developed memory, though not necessarily a perfect memory, for squirrels undoubtedly fail to find many nuts they have buried.''

GASOLINE AND FIRE WORSHIP

THE Baku region, the magnet that is drawing the oil interests into the East, was the center of the fire worship of the ancient Magi.

In a history of fire as an agent in human culture just issued, Dr. Walter Hough, head curator of anthropology in the U. S. National Museum, points out that a Parsee fire temple near Baku made the first recorded use of natural gas about the beginning of the seventh century. According to one account, the gas well was ignited by accident and continued to burn in the shrine that was built over it for over a thousand years.

The discovery of petroleum in North America during the nineteenth century, Dr. Hough points out, probably saved the whale from extinction since it put an end to the great whaling industry which had developed out of the use of sea-oil lamps. A unique torch used by the natives of the Orkney Islands utilizes the body of the stormy petrel for illumination. The sea-bird's body is so impregnated with oil that it makes a good light. The burning is sometimes facilitated by the insertion of a wick, thus making a true lamp.

The first people to use coal for fuel, according to Dr. Hough, were the Pueblo Indians of Arizona. It was dug out of near-by veins for firing pottery, but as far as can be ascertained was used only for this purpose. This sporadic use of coal antedated by many centuries its employment for fuel by civilized man.

Roman houses were heated by a kind of hot-air furnace system of pipes that conducted heated air through the rooms from a subterranean furnace. During the supremacy of Rome, also, olive oil formed the basis of one of the greatest developments in the history of illumination, declares Dr. Hough. The use of the oil-burning Roman lamp extended throughout the regions bordering on the Mediterranean, dating from the time when the empire became developed sufficiently along economic lines to have an excess of oil over what was needed for food.

ITEMS

RHENIUM, the chemical element whose discovery was recently announced by Drs. Walter and Ida Noddack, has now been obtained in pure form. The first discovery was based on the finding of the characteristic lines in the X-ray spectrum as detected by photographic plates, but now the Noddacks have succeeded in obtaining, after long and difficult refining processes, a small quantity of the substance itself. They describe it as a black powder of high melting-point that unites readily with a number of other elements. In an atmosphere of pure oxygen it ignites, forming a white oxide. The quantity so far obtained is very minute, only two milligrams, or seven one hundred thousandths of an ounce, and the experimenters are now at work to elaborate more of it which will permit of exact quantitative chemical examination.

AN electric current so small that at the pressure and price of the ordinary house lighting current it would cost less than a four hundred billionth of a cent, can be measured with the aid of a new instrument just developed in the standardizing laboratory of the General Electric Company at Lynn, Mass. It is known as a thermionic microammeter, and a current of a ten millionth of an ampere is sufficient to carry the pointer completely across the dial, while a single division on the scale represents one five hundredth of this amount. The instrument will be useful in measuring the minute currents in insulators and radio tubes, but it is stated that the chief application foreseen at present will be in combination with a photo-electric cell for accurate measurements of illumination. At present, the intensity of electric lights, for example, is measured by visually comparing them with another light of standard brightness. The electrical eye, the photo-electric cell, may now replace the human eye in this work, for the cell converts light energy into tiny electrical currents, which may be easily measured with the new instrument.

FIRST experiments in planting California redwood in the East for commercial purposes will be made shortly, when a small shipment of redwood seedlings will be set out in Natural Bridge and other national forests of Virginia, H. M. Sears, supervisor of Natural Bridge forest, has announced. The redwood will be planted on Back Run, near Natural Bridge, in the local forest. It will be given a try-out on experimental plantations of the other Virginia preserves. The work is being done in cooperation with the state forester at Charlottesville.

PNEUMONIA among the natives of Madagascar has been greatly cut down by use of the anti-pneumococcus vaccine developed at the Pasteur Institute of Paris, according to official reports just received in Paris. Pneumonia, with a high mortality, has been responsible for as many as a fourth of the hospital cases in some of the areas. The immunity conferred by the vaccine lasts about a year. The medical authorities in Madagascar have found it wise to give doses of quinine to malarial patients before they administer the vaccine in order to stave off attacks of fever which, when they occur, the natives are likely to consider a direct result of the vaccination. No ill results have been recorded as yet from this double treatment.

NATURE trails, specially laid out paths in state parks and similar areas, with bits of scientific information printed on tags fastened to trees and flowers and animal homes for the benefit of those who walk them, are becoming increasingly popular in the United States, according to Dr. Frank E. Lutz, of the American Museum of Natural History. Dr. Lutz originated the system in a nature trail which he laid out in the Palisades Interstate Park at Tuxedo, N. Y., and has assisted the National Park Service in getting similar trails marked in Yellowstone and other national parks in the West. He states that he expects two hundred nature trails to be in operation during the coming summer.