SCIENCE NEWS

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A MINOR PLANET AND CLOSE TO THE EARTH

A GREAT rock hurtling through space is having its photograph taken by astronomers eager to chart its heavenly path before it disappears from view.

This new minor planet is the smallest object in astronomy's annals, except the meteorites which smash into the earth. It came closer to the earth than any other thing in the heavens, except possibly one or two comets.

It is known as the Delporte object, after the Belgian astronomer Professor E. Delporte who discovered it on February 12. Not until several more observations were made could its path in the heavens be computed and its unusual diminutiveness and proximity discovered.

Here are the Harvard Observatory figures showing the new planet's claims to fame: Size—One third mile or only one twenty-five thousandth of the earth's size. Weight—Five hundred million tons, about the same as a small mountain. Distance away—When first observed was within two or three million miles of the earth.

Cable advices to Science Service from the International Astronomical Bureau at Copenhagen described it definitely as "planet," that is, a minor planet or asteroid, with an elliptical path around the sun.

Orbit computations made at Harvard College Observatory, University of California and University of Michigan show that the tiny planetoid is moving swiftly away from the earth. Drs. Fred L. Whipple and L. E. Cunningham located and photographed the Delporte object with the new and powerful instruments at Harvard's Oak Ridge station in the town of Harvard, Mass.

Professor Delporte has been an active discoverer of small planets and comets. One such object that he discovered in 1932, also called the Delporte object, came very close to the earth, but the present object is not the same.

Through a study of the tiny object astronomers believe they may be able to discover many hitherto unknown characteristics of similar small particles. They also hope to determine its orbit so as to make possible a prediction as to if, and when, it may return.

Because the object is so small, it is expected to be greatly affected by the gravitational forces of the planets Venus and Mercury, which it passes very closely, thus permitting the most accurate measurements ever made of the masses of these planets.

Preliminary calculations at Harvard indicate that the orbit is on approximately the same plane as that of the earth. Its closest approach to the sun is about half the distance from the earth to the sun, while its greatest distance from the sun is equal to about one and one half the earth-to-sun distance.

The estimated length of time required for the completion of the orbit is roughly sixteen months, the shortest period for any heavenly body, with the exception of the earth, Venus and Mercury.

THE BIOLOGICAL ACTION OF NEUTRON RAYS

DEADLY danger for young research workers in physics lies in wait in their own laboratories, if they work with powerful new atom-smashing machines using streams or rays of neutrons.

Neutrons are the uncharged particles of matter which can be knocked out of the cores of atoms. They are widely used as atomic "bullets" to pierce the inner nuclei of other atoms and are capable of effecting transmutation of the elements and synthetic radioactivity.

Warning of the potential danger in using such neutron rays is drawn from the results of two investigations on their biological effects, which have just been published in the *Proceedings* of the National Academy of Sciences. The neutron rays appear, in summary, to be ten times more potent than x-rays in what they can do to the body.

In the first research carrying its warning to scientific workers neutron rays were used on white rats. It was presented by two brothers, Dr. John H. Lawrence, of the Yale University School of Medicine, and Professor Ernest O. Lawrence, of the University of California, who built the large cyclotron apparatus with which the neutron rays can be produced. The second, in which neutrons were shot at just-sprouting grains of wheat, was the work of Dr. Raymond E. Zirkle, of the University of Pennsylvania, and Dr. Paul C. Aebersold, of the University of California Medical School.

Exposure to neutron rays was deadly to white rats. They grew sick, miserable-looking, humped-up and died. The rays were apparently bad for them "all over," but as a quantitative measure of their effect, the decrease in the number of the necessary white blood corpuscles in their blood was counted. It was found that destruction of white-blood cells was as great from a given dose of neutron rays as it was from a ten times more intense dose of x-rays, heretofore counted among the really dangerous scientific tools. The effects of neutron rays on growing plant tissue were found by Drs. Zirkle and Aebersold to follow about the same ratio: neutron rays are ten times as dangerous as x-rays.

Commenting on their results, the Doctors Lawrence stated: "This should constitute a warning inasmuch as many laboratories will soon be using neutron generators of such power that individuals in the vicinity of the apparatus will be exposed to many times the allowable dosage in the course of a few minutes unless adequate protective screening is provided." They set the "allowable dosage" at just one tenth the intensity of x-ray exposure that workers can stand without permanent damage to their health.

If the present warning is heeded by investigators in the universities now setting up apparatus for producing neutrons, the world may be spared the tragedies that followed

the discovery of x-rays in the late 1890's, and of radium early in the present century.

Not knowing the deadliness of the then new rays to living cells, many of the early workers were severely burned, and even maimed for life, through reckless exposure. Even yet, there are veteran x-ray technicians in scientific laboratories and medical clinics whose hands are seriously damaged—unwitting victims of the two-edged tool they used in their younger days.

THE WOOD OF OLD VIOLINS

THE secret of how the old master violin makers determined the right kind and graininess of wood to use in their beautifully-toned fabrications now is believed found. They may have used a hot branding needle on wood which had been given a slight wax coating.

If the wood was homogeneous the melting wax formed nearly a circle around the hot needle. If the wood was inhomogeneous and possessed grain the branding test showed a long, stretched, narrow ellipse.

Such at least is the simple test discovered by Professor K. Lark-Horovitz, of Purdue University, who, for years, has been studying the composition of the wood in old violins by x-rays. From the studies, some of the mystery behind the beautiful tone of an Amati or a Stradivarius violin has been learned. Professor Lark-Horovitz has found, for example, that the best instruments have a top of spruce or pine and a back of maple. The top, x-ray investigations show, must possess a distinct fiber structure. The back, of maple, is almost without structure if the instrument is to have a good tone.

What Professor Lark-Horovitz never could figure out was how the old sixteenth-century violin makers, 300 years before the discovery of x-rays, were able to tell what the wood structure might be. The only clue was the markings of branding needles which can be seen on the old masterpieces' art. From this clue Professor Lark-Horovitz finally found the simple hot branding needle test which, in its way, might tell roughly the same facts in the hands of a master as the more modern x-rays. In a lecture given before the Franklin Institute, Philadelphia, he stated that there is nothing known "about the actual use of this method, but it might be an explanation of the many traces produced by branding needles which we see on old instruments."

PREVALENCE OF MENINGITIS

MARCH and meningitis generally go together, as many communities in the United States are now realizing. Outbreaks of this serious disease, which is an inflammation of the membranes covering the brain and spinal cord, are current in Tennessee, Texas, Virginia and Kentucky. Increased number of cases all over the country have been reported to the U. S. Public Health Service.

Health officers were rather expecting this year's increase in meningitis. The disease seems to follow a cycle, the number of cases dropping to a low point and then after an indefinite number of years, rising to a high point. There was some increase last year, which suggested that the disease was on the up-swing of the cycle, and that there would be many cases this year.

In the temperate zone, which takes in the United States, meningitis is most prevalent in winter and spring, reaching a high point in March and April. It may occur at any season but there is generally more of it during winter and spring. The disease is caused by a "germ." Epidemic meningitis, the kind now growing to epidemic proportions, is caused by the "germ" known as the meningococcus. The "germs" of tuberculosis, pneumonia and the streptococcus may also cause an inflammation of the membranes that cover the brain. The technical name for these membranes is meninges, so an inflammation of them, no matter what the cause, is called meningitis, just as inflammation of the tonsils is tonsillitis. Scientists say "epidemic meningitis" or "meningococcic meningitis" when they mean the kind caused by the meningococcus.

Epidemic meningitis starts suddenly with headache and fever, a severe chill, explosive vomiting and stiffening of the neck. A physician should be called at once as early treatment is important. Diagnosis of the disease is made by examining the fluid within the spinal cord. Fairly good results have been obtained by treating the disease with a serum made from the blood of horses that have been inoculated with the meningococcus.

THE SPEEDING UP OF ELECTRIC TRAINS

FASTER and smoother acceleration on electric trains operated by the London Transport is made possible by the new method of controlling electric current known as the "metadyne." The system is the invention of the Italian engineer, G. M. Pestarini, and has been developed by the Metropolitan-Vickers Electrical Company.

With the new system a speed of 17 miles an hour can be obtained ten seconds after a train starts from rest. The present methods permit only 10 to 13 miles an hour speed after the same ten-second interval. New stock just ordered will have an acceleration of 2 miles per hour each second, or attain a 20-mile-an-hour speed in ten seconds. Because of the nature of the system such high accelerations can be attained without being noticed by the passengers.

With the type of equipment previously used by the London Transport, in which the current is fed through the resistance box controlled by the motorman, the acceleration is not continuous since the current to the driving motors is increased in steps. By contrast, the metadyne system is one of continuous, controlled acceleration without jerks. Owing to its smoothness in picking up speed it is possible to achieve greater acceleration without slipping the wheels or making passengers uncomfortable.

The standard system of control used on the board's railways to regulate the flow of current to the motor incorporates a series of resistances in the circuit. In starting a train the power must be applied to the motor by cutting out the resistances, so that the voltage reaching the motor is increased progressively. The current consumed, however, remains more or less constant, that portion not used by the motor being dissipated in the form of heat.

In the metadyne system the current passes to the negative rail through the metadyne, a type of rotary trans-

former, driven by a regulator motor. The traction motors are connected across the secondary brushes of the metadyne. The passage of current through the metadyne in the primary circuit induces a current in the secondary circuit. It is this induced current which drives the traction motor.

When a train equipped with the usual type of resistance circuit starts from rest it is impossible to apply to the motor the full voltage of the system. The voltage supplied to the motor starts low and is increased by decreasing the resistance until a speed is attained at which the full voltage can be applied. The current consumed, however, remains nearly constant. By the metadyne system current is drawn from the current rail sufficient only for the power requirements of the traction motor at any given stage of its operation.

AMERICAN GREAT LAKES HARBORS

CANADA and the United States may have reciprocal trade agreements, but the United States is benefiting at the expense of Canada in another matter over which man-made laws have no control. Harbors on the American side of the Great Lakes are getting deeper and those in Canada are becoming shallower.

The reason, as explained by Captain H. V. Canan, U. S. Corps of Engineers, is that the region about the Great Lakes is tilting about a "hinge line" which roughly is in the direction of 20 degrees west of north.

This tilt, says Captain Canan in the new issue of *The Military Engineer* just published, is generally improving conditions in harbors on the American side of the Great Lakes. He adds: "This action is material rather than merely of scientific interest and amounts to as much as 0.3 feet in some harbors. Considering vast harbor areas which are maintained to prescribed depths, a large saving in maintenance dredging costs will result when the effect of tilt on American harbors is given proper consideration. This uplift also affects the flow and the flow equations in the connecting rivers of the Great Lakes, and in computing flows for these rivers over extended periods its effects are clearly recognizable. Tilt has also been a factor in decreasing the available depths over the sills of the locks at Sault Ste. Marie, Michigan. Much of the evidence presented of decreasing lake levels is in reality the effect of tilt. Reports indicate that in about 1860, North Bay, Wisconsin, was an important harbor for schooner navigation, as many as 35 boats tying up there at one time. Adjoining a rock ledge, old ring bolts used for mooring these boats can still be found. Correcting the present charts for the stage of 1860, only about 3 feet of water would have been available. This loss of depth can only be attributed to earth tilt."

Describing what effect the observed land tilting will have on the future of the Great Lakes, Captain Canan says: "There has been much sensational speculation as to the geological future of the Great Lakes. Rather than the danger of the lakes draining down the St. Lawrence through failure of the outlet plugs, the more apparent danger, if tilt persists, is the draining of the Great Lakes above Niagara down the Mississippi system. While speculation of this sort may be mentally stimulating, any danger is so remote, and the engineering steps necessary for prevention are so relatively simple, that there is little danger of losing the vast investment by the United States and Canada on the Great Lakes."

The generally accepted explanation for the land tilt on a line passing through the Great Lakes is that the land to the north, in Canada, is still rising from the enormous squeezing which it received during the last Ice Age.

ITEMS

THREE iron meteorites, and a large fragment of a fourth, have been brought back from Chile by Mark C. Bandy, who has just returned from a collecting expedition for the Smithsonian Institution and Harvard University in the northern part of that country. The largest of the meteorites weighs 65 pounds. In addition to the "irons that fell from the sky," Mr. Bandy has brought with him a considerable collection of mineral specimens of terrestrial origin, some of which are of previously unknown types.

EXTENSIVE experimental planting of chestnut trees from Asia are to be made in the George Washington National Forest in Virginia's Blue Ridge during the present month. The test is to determine whether the trees can take the place of the native chestnuts, practically wiped out during the past three decades by the fungus-caused chestnut blight. This fungus came to America from the Orient, where chestnut trees are resistant to it. Many varieties of Oriental chestnuts have been brought to this country by plant explorers of the Department of Agriculture, and their seedlings are now ready for planting. The destruction of the chestnuts was a major blow to American forest industries, for the chestnut is a tree of many uses. It yields rough timber, wood for furniture making, bark for tanning, nuts for human food, and is also one of the most valuable trees for the support of wildlife in the forest.

ONLY fifty or sixty of South Africa's rarest animal, the mountain zebra, are left alive, and no funds are available for the further protection of the two small herds, according to an announcement made by Dr. E. L. Gill, director of the Cape Town Natural History Museum. A strict law for the protection of this animal was passed some time ago, but has never been strictly enforced, so that hunters have done their worst. There were 2,000 animals a few years ago, only fifty or sixty now, and this small fragment is apparently doomed.

FUR seals off the Northwest Coast are apparently not enemies of salmon—their underwater playfellows—if an examination of stomach contents made by Leonard P. Schultz and A. Morris Rafn, of the University of Washington, can be taken as a criterion. The stomachs of 41 fur seals, killed for food by Indian hunters, were preserved and their contents analyzed by the two research men. By far the greater bulk of the food taken by the seals consisted of squid and herring. "No bones or flesh of salmon were found," they report. "Partly digested, pink-colored squid meat might have been mistaken for that of salmon if the structure of the flesh had not been carefully studied." A full report of the study is made in the current issue of the *Journal of Mammalogy*.