SCIENCE NEWS

Science Service, Washington, D. C.

A FAMILY OF ASTRONOMERS

WHEN, at the end of this month, Dr. Otto Struve, thirty-four-year-old University of Chicago astronomer, assumes the directorship of the Yerkes Observatory at Williams Bay, succeeding Dr. Edwin B. Frost, who has been director since 1905, he will be following in the footsteps of his ancestors for three generations. His father, uncle, grandfather and great-grandfather all achieved fame in astronomical research.

Friedrich Georg Wilhelm Struve was born at Altona, in Germany, in 1793, but he went to Russia and was appointed director of the newly organized observatory at the University of Dorpat when he was only twenty years of age. In 1839 he was made director of the Imperial Observatory at Pulkowa, and died in 1864 at St. Petersburg, as it was then called. He was especially noted for his pioneer observations of double stars, bodies which are apparently single, but which are shown by the telescope to consist of two bodies revolving around each other.

His son, Otto Wilhelm, was born at Dorpat in 1819. At an early age he was appointed his father's assistant, and continued the work in double stars. When only twenty-two he made a famous series of researches to determine the direction that the solar system is moving through space. He also is known for his important work in stellar distance determination, and in the study of the nebulae, clouds of glowing gas, that are scattered among the stars. In 1861 his father retired, and he became director of the observatory at Pulkowa. He made two visits to the United States, the first in 1879, to place the order with Alvan Clark, of Massachusetts, for a thirty-inch telescope lens, then the largest in the world. In 1883 he came again to test the lens, and it was mounted in Russia the following year. He retired from his directorship in 1890, and went to live in Germany, until his death in 1905.

Otto Wilhelm Struve had two sons, both born in Russia. The first was Karl Hermann, born in 1854, who also later went to Germany. There he finally became director of the observatory of the University of Berlin. His son, Georg Struve, is now at the University of Berlin's observatory at Berlin-Babelsberg. Otto's other son, Gustav Wilhelm Ludwig, was born in 1858, and in 1886 became an observer at the Dorpat Observatory. In 1894 he went to Kharkov, in Southern Russia, to join the faculty of the university as director of the observatory and later as dean of the faculty.

His son is the present Otto, who was born in Russia, at Kharkov, on August 12, 1897. He studied at the University of Kharkov, and took a diploma in 1919, during which year he was also junior instructor. From 1917 to 1920 he served as a lieutenant in the Imperial Russian army, and later in the White Russian army. In 1921 he came to the United States, and became an assistant in stellar spectroscopy at the University of Chicago, receiving the degree of Ph.D. in 1923. The following year he joined the staff of the Yerkes Observatory, first as instructor, later becoming professor and, in 1931, assistant director. He is known especially for his studies with the aid of the spectroscope, and of the motions of stars towards or away from the earth, determined by the shift of the lines in their spectrum. He has also worked with asteroids, the tiny planets, and with the family specialty, double stars.

COMETS FROM ERUPTIONS OF JUPITER

MANY of the comets that appear in the night sky to the telescopes of astronomers may really be the product of eruptions from the surface of the planet Jupiter within the last few centuries, if the theory just proposed by S. Vsessviatsky is correct. In a communication to *The Observatory,* British astronomical journal, Dr. Vsessviatsky, who is connected with the Astronomical Institute of Moscow, renews this suggestion, which was originally made a number of years ago by Richard Proctor, a famous English astronomer.

The "capture theory," held by many astronomers, supposes that these comets originally came into the solar system in parabolic orbits from vast distances. When one happened to pass close to Jupiter, that planet, with its great mass, pulled it out of its former path by gravitational attraction. After that the comet moved in an elliptical path, between the region of the sun and the orbit of Jupiter. Dr. Vsessviatsky points out that if this were the case it would be very rarely that a comet entering the solar system would happen to pass close enough to Jupiter to be pulled into the elliptical orbit. He estimates that it would only happen to something like one in 100,000 comets, but actually, he declares, there are about sixteen of these short-period comets to a hundred parabolic ones. Also, he says, the diminution in brightness of the short-period comets indicates that their age is a matter of only a few centuries.

"The conclusion follows," writes Dr. Vsessviatsky, "that the date of birth of a short-period comet does not precede by very long the date of its discovery, whereas captures by the giant planets would occur only at very long intervals." He also points out that all of these comets are moving around the sun in the same direction as Jupiter, and the other planets, whereas if they were captured some would probably be moving in the other direction, or "retrograde." The connection between these comets and Jupiter can be fully explained by the hypothesis that they are the product of eruptions taking place on Jupiter's surface.

Besides the family of comets related to Jupiter, there are others apparently connected with Saturn, and possibly with Uranus and Neptune. The theory suggests that very active processes are in progress on the surface of the large planets, resulting in the frequent expulsion of matter.

VITAMIN G

VITAMIN G is now known to consist of two factors, tentatively called X and Y, which are as necessary to each other to produce the vitamin G effect as Siamese twins are to each other. This discovery was made by Professor H. C. Sherman, of Columbia University, and Miss Hazel Stiebeling, then of Columbia but now at the U. S. Bureau of Home Economics.

Vitamin G is the anti-pellagra vitamin, that prevents the development of the disease of malnutrition that has often been prevalent in the South among poor whites and Negroes whose diet consists largely of corn pone, molasses and "fat back" pork. It was identified by the late Dr. Goldberger, of the U. S. Public Health Service, and called by him the P–P or pellagra-preventive factor. The British have named it the B2 vitamin because it once was considered a part of vitamin B.

The Columbia University investigators split the G vitamin into two chemical parts. They set feasts before rats that had varying amounts of these X and Y factors. They watched them and weighed them to see how they grew. It was found that X and Y are both necessary. Double doses of Y without any X caused the growth curve to flatten out slowly, showing that lack of X prevented proper growth after the rats had eaten the food for some time. If two doses of Y were placed in the ration without any X factor, the rats did not attain proper growth from the very beginning.

Since rats and men are affected by vitamins with great similarity, Professor Sherman feels confident that children and adults need both the X and Y parts of vitamin G just as much as rats. Vitamin G is known to occur in milk, meat, yeast and other foods.

THE EFFECTS OF X-RAYS ON CANCER CELLS

WHEN x-rays are used to treat cancer, the cells of the cancer are not killed directly but are made to live more quickly, finish their normal life more rapidly and die of senility at an earlier age.

This answer to the hitherto unsolved problem of what happens when a cancer victim is irradiated and the cancer decreases in size was given to the American Association for the Advancement of Science meeting at Syracuse by Dr. Raphael Isaacs, of the University of Michigan, who made observations on 923 patients before he announced his findings.

It is expected that this discovery will be of great importance in understanding various kinds of cancer and other diseases of cell growth, such as leukemia, lymphoblastoma and pernicious and other anemias.

Treatment of cancer by x-rays results in a premature old age, Dr. Isaacs found. The premature old age occurs not in the patient but in the cells of the malignant growth with which he is afflicted. This is a case where premature senility is welcome.

Dr. Isaacs studied the various kinds of the blood cells and noted the effect of the x-ray treatments given the patients. Even after x-ray therapy, the blood-forming cells, both white and red, go through their lives in an orderly manner and die normal deaths.

"Nothing happens to the cells that would not have happened to them if they had lived their normal life," said Dr. Isaacs, "except that x-rays make them go through the process somewhat faster. X-rays act by hurrying the onset of old age and not by killing directly."

Radiologists have noted that there is a lag between the time of the x-ray treatment and the effect that is produced. Dr. Isaacs said that it corresponds to the time it takes the irradiated cells to live and die, in an accelerated but normal manner. Some cells, like germ cells and white blood cells, die fairly quickly after treatment with x-rays. Dr. Isaacs finds that these cells have a short adult life and therefore die soon after it is reached. Other cells, like those of muscle, nerve and fibrous tissue cells, live long after they become adults and when stimulated to develop to maturity by x-rays, they do not die of senility for a long time. The effects of the x-ray treatment are therefore delayed longer.

A favorite explanation of the action of x-rays and radium on the cancer and other cells has been that they killed the cells, but the researches reported by Dr. Isaacs repudiate this theory.

THE CAUSES OF TOOTH DECAY

EVIDENCE supporting the theory that acid-producing germs cause tooth decay was presented by Dr. H. E. Friesell, dean of the University of Pittsburgh School of Dentistry, and Dr. J. J. Enright, of the Mellon Institute, at a special symposium on dental decay held at Pittsburgh on June 19, under the auspices of the Pittsburgh section of the International Association for Dental Research.

Diet is of greatest importance while the teeth are being formed and before they are erupted, and the expectant mother and the small child should have plenty of fresh fruits, vegetables, dairy products and preparations or foods containing vitamins A and D. However, after the teeth are erupted, the conditions in the mouth and particularly the presence of acid and acid-forming bacilli are responsible for dental decay, in their opinion.

Drs. Friesell and Enright studied the effect of acid on extracted teeth and found that it produced decay which could not be distinguished from that occurring naturally. They even examined under a microscope thin ground sections of several hundred specimens of such artificially produced decay. They found that unless the acid strength was greater than that of sour milk, the acid would not produce decay under conditions like those found in the mouth.

Twenty-three varieties of bacteria found in mouths were also studied. Of these only one, the lactobacillus, could stand acid strong enough to produce decay of the teeth. This bacillus itself forms acid from starches and sugars, such as may be in food particles clinging to the teeth. A survey showed that in general progressive decay of the enamel of the teeth was accompanied by the presence of these bacilli in the dental zone and absence of decay was accompanied by absence of massive infection with these same lactobacilli. A careful clinical study at the University of Pittsburgh further showed

that measures which would reduce by two thirds the infection of the dental zone with these lactobacilli also decreased the amount of new tooth decay developing in a year.

THE BOTANICAL GARDEN AT JERUSALEM

CEDARS of Lebanon, oaks of the same species as the mighty tree called "Abraham's oak" and many other species of trees are to grow in the new botanical garden of the Hebrew University in Jerusalem which was dedicated recently. They are to play a part in an ambitious program sponsored by the university, aiming at the reestablishment of forests in Palestine, long a nearly treeless land, due to centuries of poverty, misgovernment and war.

Besides the trees, there will be an abundance of smaller plants, many of them famous in Biblical literature: "the hyssop that groweth in the wall," "lilies of the field," the mustard "tree" that grows from "the least of seeds." The aim of Dr. A. Eig is to assemble in this garden as complete a collection as possible of all the floras of Near Eastern countries, from Iraq to Sinai, and out into the deserts beyond the Jordan. It is necessary to act quickly in some localities, for the Western methods of cultivation introduced by the new colonists are destroying many species spared by the "scratchy" agriculture of the Arabs, and the necessary draining of malaria marshes is depriving other native plants of their old rootholds. To save some of these, as well as to increase knowledge regarding plants not yet in danger, is the working program.

The garden occupies the summit and part of the slopes of Mount Scopus, a high hill whence Roman conquerors once looked on the city they had beaten down. For all its historic associations, however, Mount Scopus is not an ideal spot for a botanical garden, for like most of the hill land in Palestine it is thin-soiled and lacks water. These considerations helped to determine Dr. Eig's decision to plant the resistant native plants first, and let the costlier, more exacting foreign species wait until more funds are available for their care.

One section of the garden is to be left with its native vegetation untouched, to see whether some of the stunted trees of the "maqui" will not develop into useful specimens if left for some years unpersecuted by necessitous peasants who dig up even insignificant shrubs for fuel. "Maqui" is the vegetation natural to a considerable part of Palestine and the Near East; it is a tangled mass of mixed shrubs very much like the "chaparral" of the American Southwest.

Reminiscent, too, of the American Southwest is one tree that is proving a great success in Palestine—the eucalyptus. This tree from the Antipodes has become so usual a landmark of the new settlements of Zionists that the Arabs call it "Sejeret el Jahud," which means "the Jewish tree."

The new garden will be known as the Lamport Botanical Garden. The land was donated to the Hebrew University by Solomon Lamport, of New York City, in memory of his young son, Montague.

ITEMS

THE large sun-spot that crossed the center of the sun on May 26 has returned and brought with it another almost as large, besides a group of smaller ones. Either of the two spots is big enough to engulf the earth with room to spare. The main one has changed little, being 23,000 miles across and four degrees north of the solar equator. It measured 22,000 miles on May 27. The group reached the center of the sun on June 22 and may be visible to a keen observer with the aid of a piece of smoked glass. It measures 101,000 miles across, about half the distance between the earth and the moon. The sun rotates with a period of approximately 27 days and in some cases a sun-spot persists for one or more revolutions.

DISCOVERY of light in new stars that flash out in the heavens that is like the aurora borealis was announced by Dr. Paul W. Merrill, of the Mount Wilson Observatory, Pasadena, who spoke at Syracuse as chairman of the astronomical section of the American Association for the Advancement of Science. A characteristic green line found in the spectrum of earthly northern lights was found by Mount Wilson astronomers in light from several novae, as the mysterious stars that suddenly increase in brilliance are called. This is the first time that the green line has been discovered outside the atmosphere of the earth. Dr. Merrill concluded that the gases surrounding the new stars are at higher pressures than those in the gas clouds or gaseous nebulae of the sky, but at lower pressures than the upper atmosphere of the earth, where polar lights are born.

MAINE and Montana have been added to the list of states which have attained the standards for accurate reporting of communicable diseases set by the U. S. Public Health Service, Dr. R. C. Williams, of the Public Health Service, told the Conference of State and Territorial Health Officers in Washington. The states reaching this standard now number twenty-six. The U. S. Public Health Service has computed the number of cases of a disease which occur, on the average, for every death from that disease. States which report this average number or more, for every death from the disease in the state, are considered as having reached the standard in disease reporting. Eleven cases of diphtheria, for example, occur for every diphtheria death, on the average. If there are five deaths from diphtheria reported in Maine for one month there should be 55 cases reported. They have computed similar ratios for measles, scarlet fever, typhoid fever and whooping cough.

A HIGH-SPEED passenger car with self-contained motive power will soon be placed in service between Berlin and Hamburg. Speeds of over 93 miles an hour will be sustained. The new motorized car, which is over 137 feet long, will be rounded at each end to reduce wind resistance. Its design was determined after wind tunnel tests at the Friedrichshafen Zeppelin works. Regular trains on the same run will have their speed increased to over 70 miles an hour.