SCIENCE NEWS

Science Service, Washington, D. C.

SX CASSIOPEIAE

A STAR that appears to be "playing catch" with itself, tossing a part of its own flaming atmosphere far out into space, clear around its companion in a double-star team and recovering part of it on its return trip, is described by Dr. Otto Struve, of the Yerkes Observatory, in *The Astrophysical Journal.*

The star is a rather faint double one, designated by astronomers as SX Cassiopeiae. Cassiopeia is the constellation landmarked by the great W-shaped group of stars on the opposite side of the Pole Star from the Great Dipper.

As Dr. Struve pictures the phenomeon, a stream of gas issues from one member of the double-star team and divides on the far side of the second member. Part of the stream flows off into space, while part circles around the second star and returns to rejoin the atmosphere of its parent star. Some tenuous, absorbing cloud of gases acting in this manner would explain the peculiar variations observed in the case of SX Cassiopeiae.

A powerful stream of cool but rapidly moving gas flows out from the G star toward its companion. One part of the stream, presumably composed of the more distant or more rapid strata, expends outward and leaves the system. The other part flows around the A star, and having become hotter, but traveling more slowly, ultimately returns to the G-type star. It is not possible to see this streaming action, but spectroscopic studies make this the most plausible picture.

The stream of ionized metals such as calcium and iron flows at a height above the surface of the A star about equal to the star's diameter. According to Dr. Struve, "The most interesting feature of SX Cassiopeiae is the observation of an approaching shell at and near secondary eclipse. These motions are plausibly attributed to the turning over of the stream due to conservation of angular motion. Only a part of the stream is retained by the system and completes the entire circuit around the A star."

The spectrum of this eclipsing double star is a blend of a true star of the G type, to which class the sun belongs, and lines of another origin which resemble the shell lines of an A star, a type which has much hydrogen in its make-up. The giant G-type star, which ejects the stream of gas, is believed to be larger than the luminous A-type star. The relative masses of the two, however, have not as yet been determined. The A star is completely eclipsed once every 36.567 days, giving a chance to to study the G star directly. But the streams of gas from the G star are projected upon the disk of the bright A star, so that a clear view of it is never realized for study.

That SX Cassiopeiae is not just a simple system of two eclipsing stars was discovered by Mme. L. Ceraski at Moscow in 1907. Peculiar variations in the star's velocity curve were observed by A. H. Joy at the Mount Wilson Observatory. These, Dr. Struve believes, are probably due to changes in the density of the gas within the streams. "The entire picture is very similar to that observed in Beta Lyrae," he states, "only here the smaller, and probably less massive star, is the bright A-type component."

THE POST-WAR STEEL INDUSTRY

IN a report to the American Chemical Society, Dr. John M. Weiss, New York industrial chemist, expresses the opinion that aluminum and magnesium will not seriously menace the steel industry after the war, neither will plastics. Nor will the use of plastics be a hindrance to light-metal developments.

The yearly capacity of the steel industry is approximately 100,000,000 tons, the estimated capacity figures for aluminum and magnesium are 1,500,000 tons and 300,000 tons respectively, he states. The production capacity of the light metals is less than 2 per cent. of the steel production. "Competition and new needs may so stimulate the alloy steels as actually to increase production," he said, "and thereby bulwark the steel manufacturers."

The present large uses of aluminum and magnesium are in airplane construction and in incendiary bombs. The latter will disappear with peace and the former will undoubtedly be sharply reduced. New uses for aluminum and magnesium reaching far beyond the transportation field will be necessary if the plants are to continue to operate at capacity. It is estimated that synthetic plastics capacity represents only about 15 per cent. of the projected light-metal capacity.

Dr. Weiss concludes that "Many uses of plastics, notably the protective coating field, are not competitive with the light metals. Likewise, the transparent and colored specialty products do not fall into the competitive class, so that the impact on metal is even less than the tonnage figures indicate."

MONTHLY CLIMATIC MAPS

A GLANCE at the series of new monthly climatic maps of the world prepared by the Army Map Service shows what kind of weather may be expected, on the average, each month in the year over all six of the world's continents. Each kind of climate is shown by a distinctive color, so all you need to do is find a matching color on the map of North America or other familiar region, and plan accordingly. Thus, Timbuctu in June is colored up like western Texas in July. You'll find the same color around Darwin, in northern Australia, right now—it's still high summer in the southern hemisphere.

By matching colors on these new maps, the supply officer will learn that Tokyo weather is virtually identical with that of Washington, D. C.; that the terrific Russian winters are about like normal winters in northern Minnesota, North Dakota or Maine; that the city of Duluth is climatically about on a par with Leningrad; and that Bismarck, N. D., has a climate similar to that of Moscow.

This newly developed monthly breakdown replaces the very general system of dividing the world into yearly regional climates. Presenting complete information on

the rainfall, temperature and humidity, the maps are an invaluable aid in the determination of types of clothing and equipment for our fighting forces stationed at distant and heretofore relatively unknown and uncharted regions.

Looking into the future, Major W. F. Heald, of the Climatological Unit of the Quartermaster Corps, predicts a very practical peacetime use of these maps when pleasure travel is again in order. A glance at the current map, and no guesswork at all will be necessary for planning what to pack into a suitcase on any trip, no matter where you are going.

ARTIFICIAL SUNLIGHT AND JAUNDICE

A "PILOT experiment" suggesting that artificial sunlight may be the weapon for fighting the danger of jaundice in persons who get human blood serum for transfusions or protective inoculations is reported by Dr. John W. Oliphant, Dr. Alexander G. Gilliam and Dr. Carl L. Larson, of the National Institute of Health.

The problem has caused national concern when more than 28,000 soldiers developed jaundice following inoculations against yellow fever. The Army solved its problem by switching to another type of anti-yellow fever vaccine which does not contain human blood serum. So far as known this new vaccine has not produced jaundice. Jaundice, perhaps of the same type, was the major disease with which the Nazis have had to deal on the Eastern front, according to German medical reports that have reached this country.

Even though our fighting men are not now in danger of jaundice from vaccinations protecting them against yellow fever, cases of the same ailment have been reported among civilians who were given convalescent serum for measles and mumps and following blood transfusions.

If the findings of the Public Health Service pilot experiment are confirmed by further tests, the danger of jaundice following transfusions might be averted by passing the blood or serum for the big transfusion banks in a thin stream through artificial sunlight. For smaller quantities of human serum, used to prepare vaccines against disease, advantage might be taken of the fact that about two and a half months after a person has had this jaundice, the disease-producing agent disappears from his blood.

The cause of the disease is believed to be a virus, but so far scientists have been unable to identify it, or to give the disease to laboratory animals. For the Public Health Service studies, 189 persons volunteered to get the disease so that their blood could be used to learn more about it. Most of them had only mild attacks and all recovered.

This serum jaundice is apparently not caught by contact with patients, although acute infectious jaundice is. Some believe that they are different diseases with different, unknown germ or virus causes. Others think that they are the same and that the differences are due to the difference in getting the disease through serum inoculation or through contact with infected droplets on the patient's breath.

ITEMS

THE discovery that a star, which greatly increased in brightness a number of years ago because of an internal explosion, has become egg-shaped may bring us closer to the secret of the origin of our solar system. A cable received at the Harvard College Observatory from Dr. J. S. Paraskevopoulos, superintendent of the Southern Astronomical Station of the observatory, states that the old nova in the southern constellation of Pictor, the Painter's Easel, is decidedly elongated. This nova brightened to a magnitude of 1.2 in 1925. Photographs made with the 60-inch Rockefeller reflector at Bloemfontein, South Africa, fail to show the usual haze which normally surrounds many of the novae. Revolutionary phenomena similar to those observed for the famous Nova Herculis of 1934 and Nova Persei of 1901 have apparently taken place within Nova Pictoris. These explosive phenomena may be linked with the evolution of planetary nebulae, but there is as yet no good evidence that they are connected with the evolution of planetary systems.

APPARENT support for an old folk-belief that onions, garlic and their strong-scented kin-vegetables are "good for what ails you" is offered by the reported discovery, by Professor B. P. Tokin, of the University of Tomsk, USSR, that their essential oils contain substances that kill bacteria, protozoa, and even larger organisms like yeast cells and the eggs of certain lower animals. The report is contained in a bulletin of the USSR Society for Cultural Relations with Foreign Countries. Professor Tokin has given the name "phytoncides" to the substances he has isolated. Experimental use in hospitals is now being made of these compounds, particularly in the treatment of suppurative wounds.

WATER can be used to conserve oil by means of a newly developed procedure described by W. L. Horner and D. R. Snow, of the Barnsdall Oil Company, at the Chicago meeting of the American Petroleum Institute. By injecting water into underground oil reservoirs as withdrawals are made, the original oil pressure is kept up to par. Both newly discovered and partly depleted oil pools may use this method of maintaining underground pressure, providing that reservoir conditions are such that artificial water drive can be applied. Water injection has been used only on wells that are growing old; the method has hither not been considered suitable for pools in early stages of production.

IF you want to know whether your favorite tooth powder or paste is wearing out your teeth, the National Bureau of Standards has a scientific test. The bureau now has developed a method to measure accurately the abrasive effects of tooth-cleaning preparations, and also the wearing effects on the teeth, if any, of various solutions used as mouth washes. In measuring tooth-wear from abrasion or solution, the bureau uses an "indenter" of diamond hardness developed in its laboratories a few years ago. An extracted tooth is first polished and then scratched with it, making an indentation of known size. It is then polished mechanically with the dentifrice, or dissolved in a solution. The degree of disappearance of the marks indicates the hardness of the tooth, or the wearing effect of the polishing material or of the solution.