# SCIENCE NEWS

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## A NOVA IN CONSTELLATION AQUILA

A NOVA or new exploding star has been discovered by the German astronomer, Dr. C. Hoffmeister. Located in the constellation of Aquila, the eagle, the nova was of the twelfth magnitude when discovered on September 5. It was found near Altair, the bright star in the constellation of Aquila. Dr. Hoffmeister reports that the outburst occurred between April 13 and May 2 of this year, at which time it attained the seventh magnitude.

Aquila is now visible in the evening sky in the southwest, but the nova is too faint to be seen without a telescope. Even at the time of its greatest brightness, the star was invisible to the naked eye, as only those of the sixth magnitude or brighter can be seen without aid.

Novae are not really new stars at all, but old stars which suddenly increase in brightness. The increase in light from minimum to maximum takes only a few days, but the decline is much slower. The cause of the explosion which creates this flare-up in the star has not been established.

News of the novae was telegraphed to Harvard College by way of Dr. A. Korff, of Berlin, Dr. E. Strömgren, of Copenhagen, and Dr. K. Lundmark, of Lund, Sweden.

Photographs in the Harvard collection indicate, according to Dr. Sergei Gaposchkin, that the nova reached its greatest height about April 28. Since that time it has slowly declined in brightness from between the sixth and seventh magnitude to the twelfth magnitude.

## THE HEAD OF COMETS

NITROGEN-HYDROGEN molecules made up of more than two atoms have been found to be numerous in the head of comets. Working at their respective observatories early this year, Dr. Polydore Swings, of McDonald Observatory, Dr. Andrew McKellar, of the Dominion Astrophysical Observatory, and Dr. Rudolph Minkowski, of Mount Wilson Observatory, independently concluded that a molecule composed of one atom of nitrogen and two of hydrogen plays a dominant role in the composition of the head of a comet.

Conducted mainly from measurements of spectrograms of the recent bright comets, Comet Cunningham (1940c) and Comet Whipple II (1942g), this study reported in the September issue of the *Astrophysical Journal* was made at the three observatories. Relatively few photographs of the spectra of comets in the visual region had been made previously.

The spectrum of Comet Whipple II was compared with that of an oxyammonia flame set up in the laboratory at the Dominion Astrophysical Observatory in Victoria, B. C. This flame very closely resembled that of ammonia burning in an atmosphere of oxygen. The prominent features of the two spectra matched well, and it was believed that several of the strongest features in the emission spectra of comets are due to the molecule responsible for at least part of the oxyammonia flame spectrum, this molecule probably being $NH_2$, a molecule composed of one atom of nitrogen and two of hydrogen.

## THE COMPOSITION OF OUR GALAXY SYSTEMS OF STARS

Two systems of stars in various stages of development have mixed in an irregular manner to form our galaxy, according to Dr. A. N. Vyssotsky and Dr. Emma T. R. Williams, of the Leander McCormick Observatory of the University of Virginia. Stars of the main sequence, which constitute the great majority of our stellar universe, conform to one code of motion and distribution, whereas the more massive giant stars follow a very different code of their own.

The apparent galactic concentrations of main-sequence stars can be predicted from those of A-type stars by assuming that there is the same sort of equipartition of energy among these stars as is found among the molecules of our air, according to an article by Drs. Vyssotsky and Williams in the *Astrophysical Journal*. The giant stars, on the other hand, do not follow the same pattern.

Among the stars of the main sequence, the mean kinetic energy of the red dwarfs is about the same as that of the much more massive A-type stars. From this it is assumed that all types of stars of the main sequence have, on the average, the same kinetic energy. Just as in an atmosphere of uniform temperature the heavy molecules tend to remain at lower levels than the light molecules, so among the main sequence stars the massive stars concentrate more toward the central plane of the Milky Way than the lighter stars. The much greater kinetic energies of the giant stars, it is pointed out, agree very well with the relatively small concentration of the giants towards the plane of the Milky Way.

The imperfect way in which the two systems of stars are mixed is seen in the fact that in some parts of the Milky Way there are clouds of main sequence stars and relatively few giants, whereas in other parts of our galaxy the giants appear to be more frequent.

## CHEMICAL STERILIZATION OF THE AIR

FIGHTING epidemics of influenza and similar air-borne disease by chemical sterilization of the air seems nearer to practical application as a result of studies reported by Burgess H. Jennings and Dr. Edward Bigg, of Chicago, at the New York wartime conference of the American Public Health Association.

Triethylene glycol vapor can instantaneously kill all the bacteria in the air of a room of 10,000 cubic feet capacity. The ability of this chemical, familiar as a relative of a popular anti-freeze mixture for automobile radiators, to sterilize the air has previously been shown in small experimental chambers. The studies reported show that it can be used in fairly large rooms of about classroom or hospital ward size, or offices in which a number of people work. Whether sterilizing the air in this way will keep infections from spreading has yet to be determined, but experiments so far "leave little doubt that this will be the case."

The triethylene glycol was used in the form of a vapor.

This vapor distributed itself readily throughout the room, in a manner similar to water vapor. Fans aided in a more rapid and uniform distribution. Maximum killing effect on the bacteria is obtained with a relative humidity of 35 per cent. to 40 per cent.

One device used to generate the glycol uses the principle of atomization and can be incorporated into the pre-existing duct systems of air conditioning units. Another device generates the vapor by heating a solution of the chemical.

The rate and concentration of the vapor generated must be determined by the number of air exchanges in the room air. For practical use, an instrument must be developed to control operation of the generator, starting and stopping it as the concentration of the glycol in the air changes, something as a thermostat regulates a furnace.—JANE STAFFORD.

## BUTTER RATION VALUE

THE expected increase in butter's ration value, which came into effect on October 3, need not cause alarm on the nutrition angle, if margarine is obtainable.

Aside from the flavor it gives to other foods, the chief value of butter is in its fat and vitamin A content. Ounce for ounce, margarine supplies the same amount of fat. The fat in butter comes from cow's milk. The fat in margarine comes from vegetable oils. Corn oil, cotton seed oil and soybean oil are the ones chiefly used to-day, replacing the animal fats and coconut oils of margarines of a generation ago. The margarine fat supplies the same amount of energy and is apparently as easily digested as the butterfat.

Almost all brands of margarine now on the market are enriched or fortified with vitamin A. Federal standards for enriched margarine require it to contain not less than 9,000 U. S. P. units of this vitamin per pound. The amount of vitamin A in butter varies, according to season and the cow's feed. The range may be from 500 to 20,000 units per pound.

Margarine has been declared "nutritionally equal to butter" by the New York Academy of Medicine, which recently issued a statement urging that its consumption be encouraged. Many other medical, health and nutrition authorities agree.

The latest research on the question of nutritional differences between margarine and butter has been done at the University of Wisconsin. As summarized in *Nutrition Reviews*, the results of this research indicated that the kind of starch and sugar in the diet might cause a difference in nourishing quality of butter to show up. They found butter superior to vegetable oils when fed with lactose to young animals.

"More work is necessary," according to the editor of *Nutrition Reviews*, "before it is possible to prove that butterfat possesses marked practical advantages over vitaminized vegetable oils when ingested in the presence of adequate amounts of milk solids or in mixed diets."—JANE STAFFORD.

## ITEMS

THE U. S. Public Health Service reports that after twenty years' imprisonment in a test-tube at a temperature of 50 degrees Fahrenheit, the *Bacillus pestis*, agent of the plague, emerged alive and as deadly an enemy as ever. In 1922, this bacillus was isolated from a California ground squirrel and subsequently passed through guinea pigs. From the guinea-pig cultures, one series of tubes was prepared in 1923 in which the "killer" was isolated, and a similar series set up in 1924. Showing no loss of its deadly strength as a result of the two decades of confinement, the plague germ, when released from the 1923 series and injected into guinea pigs, promptly infected them. A series of tubes prepared in 1924 is to be opened at some future date.

DR. MAX D. KOSSORIS, chief of the Industrial Hazards Division of the Bureau of Labor Statistics, at the National Safety Congress in Chicago reported that losses in manpower because of industrial injuries are higher now than they have been for many years. "Considering the trends during the last two years, the further drafting of men out of our industries, and the expected growth in our industrial employment, the trend of injuries can be expected to continue upwards." During the last few years, total work injuries have increased more rapidly than employment. Mr. Kossoris said that from 1940 to 1942 average employment increased by 19 per cent., but work injuries rose 23 per cent.

CONTRARY to expectations, the current war has not brought about an increase in the death rate from accidents, although during the war years of 1917–1918 the accident death rate rose sharply to a very high level, is reported by the Metropolitan Life Insurance Company in its *Statistical Bulletin*. The death rate from accidents among industrial policy holders rose from 67.3 per 100,000 in 1915 to 73.2 in 1916, a year of preparedness for war, and to 76.5 in 1917, the year we entered the war. The increase for the two years represents nearly 14 per cent. "Fear that history would repeat itself was strengthened," the report states, "when in 1941, also a year of active preparation, the rate rose from 46.3 in the previous year to 49.9 per 100,000, an increase of 8 per cent. In 1942, however, the rate actually declined somewhat; moreover, it has shown little tendency to rise so far this year. Even in the expanded chemical and explosives industries, the largest number of lives lost in a single accident since Pearl Harbor was 54, whereas between April, 1917 and November, 1918 there were three accidents in explosives plants, each taking around 100 lives."

FEWER apples and pears fall from their trees before ripe if new sprays and dusts developed by the U. S. Department of Agriculture are used during the growing season. After four years of experimentation with satisfactory results, the procedure is now announced to the public. The first orchard tests were made in June, 1939, on an early summer variety of apple. The result was striking. In only two days two bushels of windfall apples were picked up from under two untreated trees, and only twelve apples from under two treated trees. Later tests gave similar results. It has been now tested on 100,000 acres of orchards. The spray, which is available commercially, is principally alpha-naphthalene-acetic acid. One teaspoon of the chemical is used with 200 gallons of water.