

## SCIENCE NEWS

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## THE VELOCITIES OF NEBULAE

A DISTANT portion of the universe is apparently rushing away at a speed greater than that previously observed by astronomers.

In a communication to the executive offices of the Carnegie Institution of Washington, Dr. Walter S. Adams, director of the Mount Wilson Observatory at Pasadena, reports the discovery in two nebulae of apparent movement away from the earth at the rate of 15,000 miles per second. The highest velocities thus far indicated by observation have been of the order of 12,500 miles per second.

The two objects which seem to be rushing away from the earth with the speed of an explosion are very faint nebulae in a cluster discovered by Dr. Edwin P. Hubble in the constellation of Gemini. Estimate of their apparent speed is based upon an observation made by Mr. Milton L. Humason. They have been determined to be 135,000,000 light years distant from the earth, a very great distance but not quite as far as the frontier of observable space. Light travels at the rate of 186,000 miles per second.

This discovery is expected to be of special concern to Dr. Albert Einstein and Dr. Willem de Sitter, the Dutch astronomer, who are now in Pasadena, because of their interest in research concerning the possible expansion of the universe. It also extends our knowledge of the relation between distance and apparent rate of recession or movement away from us of distant nebulae as described by Dr. Hubble.

The fact that our Milky Way galaxy is apparently the center from which other groups of stars or nebulae are rushing at speeds of thousands of miles per second has been the matter of first importance to astronomers since it was discovered at the Mount Wilson Observatory. Evidence of the phenomenon was given by the huge 100-inch telescope there, the largest in the world, as a shift toward the red of lines in spectra of the nebulae. The more the lines are removed from their normal positions, the faster the nebulae are traveling away from the earth.

It has been suggested, however, that the nebulae may not be receding as fast as they seem and that a revision of the present accepted theories may be necessary. To verify this evidence and determine whether the universe is actually expanding is a major problem of astronomers to-day.

## METEORIC DUST

FRAGMENTS of falling stars drift gently down through the earth's atmosphere, Dr. Maud W. Makemson, professor of astronomy at Rollins College, Florida, has concluded after a series of experiments during the November meteor showers.

The experiments consisted in catching the tiny globules or meteoric dust particles in large pans, placed on a high diving tower in Lake Virginia, on the Rollins campus. The fragments were easily distinguishable

from ordinary dust and soot by their shape, color and formation. Except when shattered by impact with the receptacle, or in handling, they are usually round or of regular form. In substance they resemble volcanic glass or obsidian, while in color they range from clear glass to amber, or through amethyst to smoky gray.

An interesting feature of the glass globules is that they are electrified or magnetic, which might be expected from the fact that they pass through an electrified stratum of air far above the earth.

It is a well-known fact that while thousands of meteors enter or traverse the earth's atmosphere daily, very few meteorites ever fall intact to the surface of the globe. The fall of meteors is always accompanied by a brilliant light and usually followed by an explosion of the heated gases when the collision with the ground occurs. Consequently the fall on inhabited regions of the globe can hardly pass unrecorded.

From the thousands of meteors which explode in the air or are completely consumed by the intense heat generated in their swift motion, the tiny glass globules are formed as the result of rapid cooling in the frigid upper air. The colors are due to the various mixtures of minerals of which the original meteor was composed.

Dr. Willard J. Fisher, of the Harvard College Observatory, whose collection of cosmic dust has extended over a period of thirty years, has practically eliminated all alternatives for explaining their origin as terrestrial, having examined dust from furnace flues, locomotive smoke stacks and other sources. In Dublin, Ireland, Hartley and Ramage collected dust from the showers of Leonids in November, 1897. In France, Lucien Rudaux is at present investigating along this line.

Dr. Makemson believes that conditions in Florida are almost ideal for the collecting of meteoric particles, owing to the level, well vegetated surface, the falling currents of air, and the absence of factories and industry. She has transferred her experiments to Lake Conway, at a distance of several miles from any town in order to eliminate smoke particles and terrestrial dust as far as possible. Her plan is to continue the collecting over a period of six months, keeping the result of each week separately, and to compare the fall of dust with the observations of meteors, as reported by members of the American Meteor Society. She believes that if a correlation between the amount of dust and the number of meteors can be found, this fact will be an additional proof of the cosmic origin of the tiny globules.

## THE EFFECT OF DIET AND ENVIRONMENT ON DISEASE GERMS

THE importance of feeding disease germs the right diet and providing them with suitable environment in order to persuade them to grow in the laboratory, where they can be studied and means of combatting them found, was emphasized by Dr. Arthur Isaac Kendall, professor of research bacteriology at Northwestern University Medical School, who delivered the De Lamar lec-

ture at the Johns Hopkins University School of Hygiene and Public Health on January 12.

Dr. Kendall last year reported a method of making germs undergo a transformation, rendering visible germs invisible and large germs, that would not pass through porcelain filter pores, so small that they passed through the finest of these filters. He achieved this by providing the germs with a new type of culture medium, which is the substance on which germs grow in the laboratory. He calls his new medium the K medium, and in his lecture he emphasized the fact that it is still in a crude state and too much should not be expected from it in the way of isolating the germs of influenza and the common cold, for instance.

Dr. Kendall called attention to the fact that the environment of the digestive tract, such as his studies show, would encourage the existence of non-filterable germs, while the environment of the respiratory tract corresponds to the type of medium or environment which he found encouraged the growth of filterable germs.

"In the light of this rather striking difference between the two tracts," Dr. Kendall commented, "it is not without significance that many, if indeed not most, of the contagious so-called filterable viruses according to current information appear to enter and to leave the body through the respiratory rather than the intestinal path."

Influenza, for example, is considered to be due to a filterable virus, meaning a germ so small that it can not be seen with the most powerful microscope and that it can pass through the finest-pored filters. The infantile paralysis germ, another filterable virus, is now thought to get into the body by way of nose and throat, like influenza and common colds. The typhoid fever germ, on the other hand, attacks the digestive tract and is a germ large enough to be seen under the microscope, and too large to pass through filters.

Dr. Kendall has, however, succeeded in producing a filterable, invisible form of the typhoid germ. In the De Lamar lecture he described the procedure by which he did this.

### TREATMENT OF ANEMIA BY INJECTION

INFREQUENT "shots" of a potent liver extract into the veins of sufferers from pernicious anemia constitute the newest treatment of this disease developed at the Henry Simpson Memorial for Medical Research of the University of Michigan.

Six years ago when liver began the conquest of this once fatal disease the patient had to eat half a pound of liver a day. Then a more palatable extract was made. Later even more concentrated preparations were devised.

Now Dr. Raphael Isaacs, Dr. Cyrus Sturgis and their associates at the Simpson Institute have succeeded in producing a liver extract, about thirty times as powerful as any previously developed ones, and suitable for administration by intravenous injection instead of having to be taken by mouth. The new extract has been used successfully for some months and will be available to all physicians in a short time. Only four to six injections are necessary to restore the blood of an anemia sufferer

to normal, after which health may be maintained by injections given by a physician at intervals of from four to six weeks. No treatment is necessary in the meantime.

The history of the clinical conquest of this once-dreaded disease begins in 1926 when Dr. George R. Minot and Dr. William P. Murphy, of Harvard University, reported the successful treatment of patients with a diet containing large amounts of liver. Eating from one quarter to one half a pound of liver every day for the remainder of their indefinitely prolonged lives soon became an ordeal for the many to whom liver was distasteful. Extracts of liver and of dried hog's stomach were developed and found successful, but these also had to be taken every day by mouth, though the actual quantity was much smaller. The liver extract was unfortunately quite expensive, and even calf's liver, formerly relegated to the cat's plate, soared to unprecedented high prices. So the new extract will be hailed with joy by many liver-eaters.

Before liver was actually used to treat human sufferers from the disease, Dr. George H. Whipple, of the University of Rochester, had discovered, from observations on dogs, that liver was a powerful stimulator of the red blood cells that are lacking in pernicious anemia. The next step was Dr. Minot's perfection of the treatment for clinical use.

Other chapters in the history of pernicious anemia conquest are the development of the liver extract to be taken by mouth by Dr. E. J. Cohn, of Harvard Medical School; the development of the hog's stomach extract by Drs. Isaacs and Sturgis and Dr. Elwood A. Sharp, of the Department of Experimental Medicine of Parke, Davis and Co.; the discovery by Drs. William B. Castle, Wilmot C. Townsend and Clark W. Heath, of the Thorndike Memorial Laboratory, Boston City Hospital, that beef muscle acted upon by normal human stomach juice forms a substance that promptly alleviates pernicious anemia and that the normal human stomach secretes a hitherto unknown substance that prevents the development of pernicious anemia, and, finally, the isolation from liver, by Drs. R. West and H. D. Dakin and Marion Howe, of Columbia University College of Physicians and Surgeons, of a crystalline salt which is active in pernicious anemia.

### WATER IN THE HUMAN BODY

THE living human body is full of ice, Dr. Neda Marinnesco, of the Paris Institute of Physico-Chemical Biology of the Rothschild Foundation has announced in a lecture given at Brussels under the Institute of Higher Studies.

Science is not content to have only one kind of ice like your refrigerator. Six different varieties have been discovered by Professor P. W. Bridgman, of Harvard University, in the course of his high pressure researches. Variety number six, which Dr. Marinnesco has found in the human body, exists at ordinary temperatures, between 40 and 176 degree Fahrenheit, only under enormous pressures of over a hundred thousand pounds per square inch.

Dr. Marinnesco states that in living tissues this enormous pressure exists because of the great attraction of

the body colloids or jellies for water. This attraction compresses the water and changes it to solid "ice number six." That is why it is almost impossible to squeeze a drop of water from a living muscle, though it contains a large proportion of the liquid. When the organism dies, its attraction for water diminishes and the "ice number six" becomes again liquid.

Dr. Marinesco used an original method for determining the attraction for water of the various body colloids, including chiefly proteins, etc. He measured the "dielectric constant" of their solutions by means of high frequency radio waves. This tells whether the molecules of a "polar" substance, such as water, are free to turn around, or whether they are "hooked" to neighboring molecules.

For instance, liquid water has a dielectric constant of eighty units, but when it freezes to ice its dielectric constant drops to two units. Most of the water in the human body has also a dielectric constant of only two units, hence it is akin to ice.

### HAWAIIAN RACIAL PROBLEMS

RACIAL problems in Hawaii have caught the world's eye suddenly, but scientists have been watching Hawaii for some time, aware that in this small area in mid-ocean a unique development in racial evolution is going forward.

Hawaii is a laboratory where nature is making a big experiment in race-crossing. Members of the chief racial groups of the world have gathered on these cross-roads islands in the Pacific. Class distinctions have remained about as rigid as in other places. But race distinctions have become blurred and have lost their appearance of importance. At schools, social gatherings, at work, there have been contacts between Europeans, Orientals and the brown Hawaiians. No laws prevent inter-racial marriages in Hawaii. So, everything is in favor of a complex blending of racial stocks. Racial or national lines are crossed in about one marriage in four.

What the Hawaiian Islanders are coming to represent, in the way of a racial type, is of great interest to geneticists. It is still the prevailing view in scientific circles that wide race mixtures are bad. Descendants have a tendency to preserve weaker traits rather than the finer traits of both parents. But some of the combinations developed on the Hawaiian Islands are recognized as improved racial types.

The blend of Chinese and Hawaiian in the Hawaiian Islands has produced a stock which stands first among all hybrids in industry and self-support, is the view that has been expressed by Dr. Chas. B. Davenport, of the Carnegie Institution of Washington. In these island half-breeds the intelligence of the Chinese has combined with the well-stabilized, patient temperament of the Hawaiian.

Children born of Chinese fathers and Hawaiian mothers grow to be intermediate in size, taller than the short Oriental, shorter than the tall Hawaiian. This was the finding of Dr. A. M. Tozzer, of Harvard, who has taken scientific measurements of Hawaiian Island inhabitants. The head-shape of first generation Chinese-Hawaiians was found to be like the Hawaiians, but the

face and nose resembled their Chinese ancestors. Some of the first generation hybrids had curly hair, some straight.

Results of some of the other racial blends are not yet so clearly understood. Japanese make up almost forty per cent. of the Island population. Europeans and Americans are not so numerous, but in Dr. Tozzer's investigation he found that these nationalities mated with Hawaiians with a frequency out of proportion to their numbers on the Islands. Of the hybrids he measured, 57 per cent. were part European.

Another Harvard expedition, under the direction of Dr. H. L. Shapiro, initiated a new study of the Hawaiian Island people about a year ago. This investigation has as its aim to learn how racial mixtures affect bodily size and energy and other matters of inheritance. Several years' work were projected.

### ITEMS

No indication of an epidemic of influenza appears in the reports of state health officers to the U. S. Public Health Service. For the week ending January 9, the latest for which reports are available, there were 1,227 cases of influenza reported throughout the country. This is an increase of 119 over the previous week's total, which is not considered significant, especially as this is the time of year when a slight increase in influenza and all respiratory diseases normally occurs. The U. S. Public Health Service has not been officially notified of any influenza epidemic in England, although unofficial reports of one have come to this country.

TEN cases of parrot fever with one death in California have been reported to the U. S. Public Health Service. The fatal case was that of Walter R. Kaestner, the U. S. customs inspector at San Pedro, port of Los Angeles, who died on January 11. A wire report from the city health officer of Los Angeles states that the customs inspector in the course of his duties handled three shipments of birds during December. Since the outbreak of parrot fever in this country in 1930, parrots shipped into this country must be held in quarantine by the customs officials for a period of observation, to determine whether or not they are suffering from the disease. The San Pedro inspector is reported to have taken two parakeets and two rice birds home to his wife.

DR. VEADER LEONARD, of the School of Hygiene and Public Health of the Johns Hopkins University, writes: "The following note appears on page 9 of the issue of SCIENCE for January 1, under Science News: 'A safe and apparently certain treatment for hookworm was found in the synthetic antiseptic, hexylresorcinol, by Dr. Veader Leonard, of the Johns Hopkins University.' While I am responsible for having introduced hexylresorcinol into medicine some years ago, the anthelmintic properties of this drug were discovered and its clinical application as an anthelmintic was first developed exclusively by Dr. Paul D. Lamson, professor of pharmacology at Vanderbilt University, and his associates, Drs. B. H. Robbins, H. W. Brown, C. B. Ward and R. L. Caldwell."