SCIENCE NEWS

Science Service, Washington, D. C.

DOUBLE HYDROGEN ATOMS

HYDROGEN atoms twice as heavy as usual, forming probably a new unit in the building of all other chemical atoms and throwing new light on the atom core, have been detected through the collaboration of Professor Harold C. Urey and G. M. Murphy, of Columbia University, with Dr. F. G. Brickwedde, of the U. S. Bureau of Standards in Washington, D. C.

The low temperature laboratory of the bureau, in which liquid helium was made for a first time in the United States some months ago by Dr. Brickwedde and others, assisted in the discovery of this new hydrogen isotope, which differs from ordinary hydrogen only in the weight of its atoms. By evaporating liquid hydrogen under a reduced pressure, and at the excessively low temperature of freezing hydrogen, 435 degrees below zero Fahrenheit, a partial separation of the heavier atoms was achieved. Professor Urey and Mr. Murphy then examined the heavier distillate in their spectroscope in New York and found a new series of "Balmer" lines that could only be attributed to hydrogen atoms of atomic weight two. Only one atom out of four thousand in ordinary hydrogen gas, however, he finds, is one of the new H2 kind.

Professor Urey himself had predicted last May that this hydrogen isotope of weight two would be found. His conclusion was drawn from a consideration of the relations between the numbers of electrons and protons in the known atomic nuclei. Independently Professor Herrick L. Johnson, of the Ohio State University, and Professor Raymond T. Birge and D. H. Menzel, of the University of California, had made the same prediction. Dr. Johnson followed practically the same reasoning as Professor Urey, while Professor Birge reached his conclusion from a comparison of chemical atomic weights and isotopic weights obtained direct by Dr. F. W. Aston in Cambridge, England.

Faintness of the spectrum or rainbow of the light emitted by the heavier hydrogen prevented previous seekers from observing the tell-tale lines, Professor Urey believes. Professor Urey did indeed observe these lines in the spectrum of ordinary hydrogen gas, but they were so faint that he could not be sure they were not "ghost" lines caused by irregularities in the apparatus used for detecting them. When in the low temperature experiments the proportion of the rare isotope was raised to 1 in 800, however, the H2 lines became visible near the regular lines of the "Balmer" spectrum. The nucleus of the new atom lies in weight in between ordinary hydrogen, weight one, and helium, weight four, both of them regarded as the units of which the cores of all other atoms are made up. The new H2 provides a new building block for atom nuclei, according to Dr. Brickwedde, and will be investigated with great eagerness by both chemists and physicists for the light it will throw on the way that the nucleus is built up.

The outside coatings of the new hydrogen atoms are identical in all respects, including chemical properties, with ordinary hydrogens. Only the mass of the nucleus is different. These two forms are not to be confused, however, with the symmetric para and unsymmetric ortho hydrogen atoms discovered in 1929 by Drs. K. F. Bonhoeffer and P. Harteck at the Kaiser Wilhelm Institute for Physical Chemistry in Berlin. These forms of hydrogen were of equal weight but different magnetic properties.

A new still will be made at the Bureau of Standards, which Dr. Brickwedde will use to attempt a more complete separation of the hydrogen twins. As the one is twice as heavy as the other he believes that this should be quite possible.

INTERSTELLAR ABSORPTION CLOUDS

THE distinction of living in the midst of the largest aggregation of stars in the universe was probably snatched from earth dwellers by Dr. Frederick H. Seares, assistant director of Mt. Wilson Observatory, when he reported to the Carnegie Institution of Washington that clouds of dust and gas in our galaxy dim the light of star clusters and thus astronomers were misled in thinking that they were farther away than they really are.

Instead of the stellar system in which our sun is a minor star being some five times the size of the largest spiral nebulae in the heavens, Dr. Seares believes that a correction for the absorption of light by interstellar gas and dust clouds will narrow down this difference, perhaps even showing that the galaxy around us is quite ordinary in size.

The portion of the universe in which the earth and mankind happen to be loses again a claim to distinction among the millions of other galaxies or "island universes" that giant telescopes reveal as dotting the heavens in all directions.

Present estimates that it takes light 200,000 years to travel across the diameter of our stellar system depend upon determinations of the distances of the globular star clusters, Dr. Seares explained. In these clusters of stars there are stars whose light waxes and wanes in regular periods. Some years ago it was discovered that the time of these stellar light variations was the key to the true brightness of the variable star. By comparing the real brightness and the luminosity of the star as it appears from earth, it was possible to find its distance. The so-called Cepheid variable stars thus became the yardsticks of the heavens.

By obscuring the light from these distant stars used as measuring sticks, Dr. Seares holds that the clouds of nebulosity in the plane of the Milky Way have so shortened the standard of length that it has given too high values.

Aside from its supposed larger size, the galaxy around us is so typical of the spirals that, Dr. Seares explained, "study of the spirals helps us to understand the galaxy." If we could look at the Milky Way and the rest of our galaxy from a point a million light years out in space it

would look something like the great nebula in Andromeda or the famous Messier 33 nebula. It would have a great watch-shaped contour, stars scattered within, and great stellar aggregations, luminous nebulae and dark obscuring clouds located in the central plane of the galaxy.

Proof of Dr. Seares's inference that obscuring clouds are wide-spread over the central plane of the galaxy was aided by photographs made at Mt. Wilson Observatory by Dr. F. E. Ross, of Yerkes Observatory, working with a very efficient short-focus telescope lens of his own design. These photographs show more clearly than ever before that the rift running from the constellation of Cygnus to that of Circinus and separating the two luminous branches of the Milky Way is formed by dense absorption clouds.

AIR FILTER TO ALLEVIATE HAY FEVER

PEOPLE who suffer from hay fever will soon be able to have air filters installed in their homes which will remove irritating pollen from the air. Experiments just concluded at the University of Illinois Research Hospitals have demonstrated the practicability of relieving hay fever patients of distress by means of air filters. The filters used were adapted from the commercial form by Dr. William H. Welker and were used in an extensive series of experiments conducted by Drs. Tell Nelson and Ben Z. Rappaport.

People suffering from hay fever, according to Dr. Rappaport, were relieved of most of their symptoms in from one half to one and a half hours after entering a room in which the air had been drawn in from the outside through these filters. Patients who were used in these experiments slept well except on very hot nights when the room was uncomfortable because of the heat, but patients suffering from asthma were only partly relieved.

"Actually, very severe cases of hay fever who find life almost intolerable for two months unless they get away," Dr. Rappaport said, "are greatly benefited. The filtration is at best, however, as an adjunct to treatment by immunization."

People who are only partially relieved by immunization treatment, he pointed out, can be benefited by using in addition a filtering machine in their bedrooms, thus exposing them to pollen only when they must be out of doors. A good percentage of the 2,500,000 to 6,000,000 people who have hay fever in the United States can in this way be partially aided.

The experiments carried on at the University of Illinois Research Hospitals were conducted in one of the wards in which a machine was installed which drew air in from the outside through a number of paper filters. Over 100 persons were observed. Those with hay fever only were kept in the room at night and permitted to pursue their customary activities during the daytime. Patients with asthma were kept in the room 24 hours a day.

The hay fever cases were relieved of most of their symptoms in from one half to one and a half hours after entering the room. They slept well. The relief, however, was not complete, as most of them had a mild attack of hay fever in the morning on awakening.

The asthma cases caused by the fall pollens were only partially relieved, several not until they had been in the room four or five days. Their asthma returned a few hours after leaving for home.

Further work with improved filtration machinery is being planned by the University of Illinois group for next year.

TREATMENT FOR PELLAGRA

A METHOD of treating pellagra, based on a new theory of its cause, has been reported by Dr. Ibrahim Sabry, skin specialist to the Government Hospital at Alexandria, Egypt, to the London *Lancet*.

Dr. Sabry's method consists simply of daily injections into the veins of a small amount of a sterilized solution of a common chemical, sodium thiosulphate. The skin lesions which are a distressing feature of pellagra are checked in early cases after only a few injections and disappear quickly in late and lingering cases. Gangrenous limbs, sometimes seen late in the course of the disease, soon heal under this treatment. Other symptoms clear up as the disease yields to treatment. From 20 to 60 injections are needed. So far no complications whatever have been met with.

Dr. Sabry considers these facts sufficient grounds for contesting utterly the idea that pellagra is caused by vitamin deficiency, since no disease due to deficiency of a vitamin has ever been known to improve without supplying the lacking vitamin and certainly not from the mere introduction into the body of a drug that can not contain any vitamin.

Instead, Dr. Sabry believes that the symptoms of pellagra are due to presence in the body of a poison belonging to a chemical group having the name dioxyphenylalanine. This is closely related to tyrosine, which occurs normally in the body. He claims that the pellagra toxin which he calls "dopa" has been obtained from the vegetating seeds of beans. He therefore attributes pellagra in Egypt mainly to the consumption of beans.

Dopa may also occur in maize or any other cereal. It may get into the body by way of food, such as beans, maize or other cereals, or it may be formed in the body by the action of some parasite or "germ." Dr. Sabry is of the opinion that it gets into the body by way of the food eaten, and specifically from beans.

THE ORIENTAL LAND-LEECH

THE Oriental land-leech, known among scientific circles as the Haemadipsa (takers of blood) is found abundantly in the jungles, forests and mountain slopes of India. For years, residents of these sections, particularly in the vicinity of Darjeeling, explorers and hunters have complained of these pestiferous and uncanny animals.

Dr. J. Percy Moore, of the department of zoology of the University of Pennsylvania, has just returned from India where he has spent a year in the field studying their habitat, behavior and physiology. He was partially prompted to make this study because comparatively little is known of the land-leech, aside from the frequent accounts of their abundance in India and the annoyance they cause. Athough Dr. Moore has returned with a wealth of information, additional work will have to be

carried on in the laboratory before a complete knowledge of the animal is obtained.

From his study abroad Dr. Moore has come to the conclusion that the land-leech has sense organs of touch, light perception and taste-smell. All three of these sense perceptions are used to ascertain the presence and position of their prey. A hungry leech in the field tends to move upward. This is known as negative geotropism. It will climb any plant or object with which it comes into contact and when the high point at the top of a blade of grass or a plant is reached, it will stop, and, attaching its posterior sucker firmly it will stretch its body to the utmost and with rather violent movements will reach in all directions. It is from this higher position and this reaching manner that it may possibly come in contact with its prey.

Dr. Moore experimented with the sense of smell perception of these leeches. Many times he watched them climbing. After they had been unsuccessful in coming in contact with him, they descended to the ground, moved to a closer stem, and repeated their climbing and stretching. After they had almost reached him, he carefully moved to a new position and noted that after some hesitation they changed their course and still followed him.

The Oriental land-leech, which thrives only on the blood of vertebrates, has an enormous appetite although it feeds only occasionally. Dr. Moore weighed some of them before feeding and after. He allowed them to feed on frogs or sometimes he allowed them to attach themselves to his hand and drink his blood. These experiments showed that some of them actually imbibed eleven times their own weight of blood. One feeding, however, may suffice for several months, for a year, or even for life.

ITEMS

A "BRASS BRAIN," that ferrets out cyclic variations in the amount of heat and light put forth by the sun, was demonstrated by Dr. Charles G. Abbot, secretary of the Smithsonian Institution, at the meeting of his board of regents. It consists of a simple but ingenious arrangement of sliding brass pins on two wheels, which will automatically untangle a curve representing one period of activity from a compound curve in which more than one such period may be indicated. The device is intended for use in Dr. Abbot's study of the fluctuations in the amount of energy radiated by the sun. Many years of research have led him to the belief that these fluctuations are indirectly reflected in weather changes, and that eventually a reliable method for long-range forecasting may be based on them.

VERMONT will add another unit to the chain of northeastern seismograph stations. Plans for the installation of a Milne-saw seismograph of the most modern type have been announced by Professor Elbridge C. Jacobs, of the department of geology. The instrument will be set up in the new Robert Hull Fleming Museum of the University of Vermont. A grant for this purpose has been made by the National Research Council, and it is hoped to have the apparatus in operation by the fall of 1932.

A SUBSTANCE having remarkable powers of controlling the growth of living beings and of possible value in the treatment of cancer is being investigated in the laboratories of the Royal College of Surgeons of England and at King's College, London. The discovery is due to a young biochemist, J. H. Thompson, who has found that an extract of the parathyroid gland of cattle will restrict or prevent growth without endangering the health of the organism. The most important application of this discovery lies in the treatment of cancer. It is being tested in several London hospitals with very encouraging results. Sir Arthur Keith has further suggested that it may be of value in the treatment of the disease called acromegaly or gigantism which is due to abnormal functioning of the pituitary gland.

DON'T plant pure stands of conifer trees in forests that are being established or rebuilt, warns Eldred R. Martell, of the University of Michigan, in an article which will appear in the forthcoming issue of *The Journal of Forestry*. Pure stands of such evergreens, he claims, have a bad effect on the soil in which they grow, leaching it of necessary soluble minerals and causing the development of solid layers of "hardpan" that interfere with the circulation of soil water and prevent deeper penetration by tree roots. Mr. Martell holds that rain water, seeping downward through the littered needles on the forest floor, becomes acid, making it a too-efficient solvent of the mineral nutrients that should be left there for the feeding of the trees.

AMERICAN automobiles are losing popularity in the Philippine Islands. They are attacked by the little thread-like feeding organs of fungi. These organisms cause decay in the wooden parts of autos, with the result that the doors begin to sag and the top starts rattling or gives way entirely. Even upholstery is not immune. Most automobiles in the Philippines are American made, using temperate-zone woods. European cars are few, but many of them, to circumvent the fungi, use tropical woods which are not susceptible to fungous decay. Ravages of the fungi occur within the first or second year of the car's life. Spores of the fungi, spread by the wind, light on automobiles and germinate. Moisture necessary for the fungous growth gains entrance to the wood used in the car, usually at the joints. Assisted by hot weather and plenty of rainfall, the fungi grow rapidly. They send out cotton-like threads, secreting ferments, which spread throughout the wood tissues and destroy them. Two remedies are suggested by C. J. Humphrey, mycologist of the Bureau of Science, Manila, in a report to the *Philippine Journal of Science*. Resistant Philippine woods could be shipped to the U. S. for the manufacture of cars destined for the tropics, or American woods could be treated with substances, such as creosote, to render them reasonably safe from decay. All-steel auto bodies, of course, are in no danger from the fungi.