SCIENCE NEWS

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MASS PRODUCTION OF HEAVY CARBON ATOMS

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MASS production of heavy carbon, the isotope of the ordinary kind of carbon that is a basis of all living matter, was announced at the meeting of the American Chemical Society by Professor Harold C. Urey, of Columbia University.

By the chemical method of separating the heavy kind of carbon of mass 13, from ordinary carbon of mass 12, Professor Urey is now able to supply the needs of scientific workers all over the world with this valuable stable kind of carbon whose atoms can be used as tags to aid chemists in labeling parts of their atoms. By adding atomic tags at the proper places intricate reactions can be carried out and the movement, within the molecule, of the atomic tags can be deducted.

With the successful production of quantities of carbon of mass 13 (which, incidentally, you can buy at $400 an ounce) the elements hydrogen, carbon, oxygen and nitrogen are now available in their stable isotopic form for use as tags in research. These four elements are found in over 90 per cent. of all chemical compounds known, and are especially important in all biological problems.

The other way to produce tags on atoms to trace out chemical behavior is to bombard them in atom-smashing machines and render them radioactive. This radioactivity, or spontaneous disintegration, can then be detected with the proper instruments.

In an interview, Professor Urey said: "Much interest has been exhibited in recent years in artificially radioactive substances in solving important biological problems. But it really seems to me, at the present time, that most of these problems can be solved best by the use of the stable isotopes of the overwhelmingly important elements, hydrogen, carbon, oxygen and nitrogen which can only be supplied in quantity by the chemical method of the separation of isotopes. Fortunately it appears that the stable and radioactive isotopes complement each other in scientific investigation. The chemical method of separation of isotopes works best with the all-important elements, hydrogen, carbon, nitrogen and oxygen. The method of thermal diffusion and the artificially radioactive method of tagging elements works very well for the remainder of the elements in the periodic table."

While atom-smashing and the production of radioactive elements for biological and chemical experiments is the current trend in physical science there are a whole host of experiments which are lengthy ones, involving the feeding of experimental animals with isotopic materials. For all such experiments, many of them the most important in the realm of biology and physiology, it is essential to have stable isotopes and not radioactive ones which disintegrate quickly. The half life of radioactive carbon, the element found in all living matter, is only about twenty seconds. Experiments performed with radioactive carbon must be done quickly. Such haste, potentially, may lead to errors.

ROBERT D. POTTER.

MAGNETISM OF THE NEUTRON

MAGNETIC strength of the neutron, the smallest known particle without an electric charge, is 2,000 times smaller than the magnetic strength of an atom of iron. Expressed in the ordinary magnetic unit, it would require more than 20 zeros behind the decimal point before the first significant digit. Yet the results are declared to be correct within one per cent.

These results were announced on September 17 by a joint research team representing the University of California and Stanford University, which has been using the big cyclotron at Berkeley. Physicists who have worked on the problem are Professors Felix Bloch and Norris E. Bradbury, of Stanford University, and Professor Luis W. Alvarez, of the University of California.

A stream of free electrons was shot from the cyclotron at a magnetized iron plate. Those that passed through were polarized, that is, their minute magnetic fields were arranged parallel with that of the iron plate. These polarized neutrons were then permitted to strike a second magnetized iron plate. If the magnetization of the second plate was along the same lines as that of the first, the maximum number of neutrons was found to pass through it. But if the second plate was turned around so that its north pole lay in the opposite direction to the first plate's north pole, then the least number of neutrons would pass through the second plate.

To measure the strength of the neutron magnets themselves, Drs. Bloch and Alvarez simply turned the neutrons around, instead of turning the second plate. This was done by creating between the plates a magnetic field which oscillated at a radio frequency of about two million times a second. The oscillating field caused the neutrons to turn somersaults.

When the frequency of oscillation was such as to cause the maximum number of neutron somersaults, then the minimum number of neutrons passed through the second plate. A delicate counter was used to determine the precise condition of minimum passage, and from the oscillation frequency under that condition the strength of the neutron magnet was determined. In the course of the experiments 50 million neutrons were counted.

FUEL TANK EXPLOSIONS IN ENGLAND

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OUT of England's mystery of exploding gasoline storage tanks, which Scotland Yard first thought was the work of Irish terrorists, has come the amazing discovery of a species of bacteria which can live on kerosene and ferment it into ethane and methane fuel gases, just as ordinary bacteria can ferment sugar into alcohol.

At the Boston meeting of the American Chemical Society, the new discovery had chemists shaking their heads and speculating on this new-found way to let nature create for them these hydrocarbon gases which can be the starting point of a host of synthetic chemical compounds.

The new kerosene-fermenting organisms were first described informally, and totally unreported, at the meeting

of the International Congress for Microbiology in New York recently. The eminent British bacteriologist, Dr. A. C. Thaysen, of the British National Scientific Laboratory at Teddington, who is now on the high seas hurrying back for military service, described the new discovery.

His story, as related by chemists who talked with him in New York, runs like this:

Scotland Yard for months has been puzzled by mysterious explosions in gasoline storage tanks holding their wartime precious fuel. Sabotage was suspected but unproved, for the terrific explosions brought complete catastrophe. Dr. Thaysen, as the government's expert on the generation of gases by bacteria, was also called in but could find no answer. Finally, and fortunately, a kerosene tank blew up. A quick examination after the explosion showed bubbles of gas rising from the layer of water at the tank's bottom on which the kerosene had been floating. Taking some of the water and sediment to his laboratory, Dr. Thaysen discovered his new kind of bacteria which can live in kerosene and ferment it into 10 per cent. ethane and 90 per cent. methane. He cultured this organism and then sub-cultured it and obtained a pure strain of bacteria that would grow and propagate. It was the explosive methane and ethane gas generated by these bacteria which caused the explosion. While he has not yet solved the gasoline explosions he is virtually certain that a similar action occurs there too.

Chemists who understand bacterial fermentation see no reason why the discovery is not true, for they know of organisms which will live in strange places and which can ferment phenols like carbolic acid and also benzoic acid.

Dr. Thaysen is well known in his field as a careful investigator. While the new discovery must, of course, be substantiated by other workers, chemists are giving credence to Dr. Thaysen's amazing discovery.—ROBERT D. POTTER.

IMPROVED CHEMICAL TREATMENT FOR COMMON COLDS

AN improved chemical advance in the fight against the common cold, one of the unconquered afflictions of mankind, was announced at the meeting of the American Chemical Society by a physician-chemist research team, Drs. Simon L. Ruskin and M. P. Fejos, of New York.

By the new method, drugs frequently used in treating the common cold, adrenalin, ephedrine and benzedrine, are reacted with vitamin C (cevitamic acid) to produce stable compounds of enhanced physiological action. Both the drugs for colds and the vitamin are, by themselves, unstable materials, losing their potency with relative quickness. In combination, however, they form compounds that retain their potency for over two years.

Ephedrine, used to decrease nasal secretions and "dry up" a cold, is improved by the action of vitamin C. Some of the undesirable effects of this drug—nervousness, palpitation and intestinal upset—are diminished by the vitamin C radical.

"The wide-spread use of ephedrine in the treatment of common colds," they stated, "makes the preparation of ephedrine cevitamate a definite advance in the chemistry of the treatment of the common cold and suggests a chemical rational for the wide-spread use of drinks rich in vitamin C. It similarly marks an advance in the treatment of asthma and hay fever."

The action of vitamin C on the new drug sulfanilamide is also being studied. A stable compound has been found to result from the combination. This compound has an increased solubility over ordinary sulfanilamide.

It is reported that "Investigation is proceeding on the use of sulfanilamide cevitamate for the prevention of the complications of the common cold."—ROBERT D. POTTER.

DEBATE ON THE VIRUS CAUSE OF CANCER

CAN cancer be caused by a virus, the kind of ultramicroscopic substance that causes infantile paralysis, influenza and other baffling ailments? The case for and against this theory of cancer cause was debated by leading English and American authorities on cancer and on viruses at the closing sessions of the third International Cancer Congress.

The idea should be given very careful attention, according to Dr. C. H. Andrewes, of London. He pointed out that viruses are now accepted as the cause of some tumors in animals. There is no proof yet, he stated, that viruses are concerned in the cause of cancer in general, but the viruses have properties which fit them for the rôle of cancer-causing agents and they should therefore be given further study in this connection.

On the other hand, Dr. James B. Murphy, of New York City, gave as his opinion that there is no justification for the idea that there is one "universal virus" which causes cancers. Investigation of the viruses which cause tumors in animals is, however, interesting and important. The chief point against the idea that human cancer is caused by a virus is the failure so far to find a filterable substance such as a virus in tumors of mammalian animals (mouse or man) which can cause tumors when injected into other animals. This point was stressed both by Dr. Murphy and Dr. Andrewes.

Whether or not viruses cause cancer in man, they may provide the best lead to discovering the nature of "directive factors" in the life processes of both normal and cancer cells, and thus perhaps to discovery of what directs a cancer cell to become cancerous. This suggestion was made by Dr. W. M. Stanley, of the Rockefeller Institute at Princeton, N. J., who succeeded in isolating some viruses in the form of crystalline, non-living protein matter. The viruses represent a key to abnormal tissue changes, he said, and because many viruses are now available in essentially pure form for study, investigation of them may give the key to the abnormal tissue change that is cancerous.

Until these problems of cancer causes and prevention are solved, the practical attack on cancer rests on established methods of treatment applied as early as possible. The importance of early treatment was stressed at another session of the congress, and was summed up in survey figures quoted by the president, Dr. Francis Carter Wood, of Columbia University, New York.—JANE STAFFORD.

THE NEW ENGLAND HURRICANE OF A YEAR AGO

HURRICANE blasts tore at New England's woods and farms and towns on September 21 a year ago, leaving hundreds of deaths and millions of dollars' worth of property loss in their desolate wake.

To-day, a glance in the direction of New England discloses a picture unexpectedly cheerful. A combination of New England grit and general American intelligence and efficiency (plus a good deal of plain, ordinary healing by nature itself) has made possible much salvage out of the wreck and a real measure of progress toward full recovery.

A survey by the U. S. Forest Service shows that 9,551 New England timber owners have nearly one and two thirds billions of board feet of timber under agreement for salvage. Actual deliveries, however, are not expected to reach much more than half that figure, for a number of reasons. Nevertheless, by next spring some 875,000,000 board feet will have been brought out of the woods, in marketable timber forms.

About two thirds of the job has already been completed. 560,401,000 board feet are already out and stored, either as logs in ponds or as sawed lumber in yards—209,120,000 board feet in the latter category alone. Something over $6,453,000, from the New England Timber Salvage Administration, has changed hands over the whole transaction. The U. S. Forest Service takes no part in the commercial transactions; its task has been to help protect the down-timber areas from fire and to facilitate handling generally.

A conspicuous factor in the success of the salvage program has been the close and effective cooperation of all parties concerned—federal and state agencies and the public at large—in preventing fire. Despite the unprecedented drought from which the entire Northeast suffered this summer, greatly aggravating the fire hazard, there have been only two fires in the whole area that exceeded 1,000 acres in extent. There were several thousand little fires—all promptly extinguished before they could spread.

The work has been carried on by an army of some 14,000 men, divided among three main agencies: 3,400 in the CCC, 7,700 in WPA and 3,064 in the New England Forest Emergency corps. There are 18 permanent camps of 50 men each, two camps of 100 men each; the rest of the workers commute to their jobs from towns and farms.

Replacement of New England's devastated woodlands is proceeding naturally. Seedlings and young saplings were not broken or uprooted by the storm, and they are already showing rapid growth. Also, last season's white pine cone crop was heavy, so there should be thick stands of seedlings of the year.—FRANK THONE.

ITEMS

FALL begins officially at 5: 50 P.M. Eastern Standard Time September 23, according to calculations made at the office of the Nautical Almanac at the U. S. Naval Observatory. At that instant the sun will be passing over the earth's equator on its southward journey which brings autumn to the northern hemisphere. September 23, too, is the day when the moon passes the planet Mars in the sky. This passing will occur at 3: 05 A.M. Eastern Standard Time.

AN extremely rich and large deposit of iron ore which contains about half of the total world iron resources will begin in 1940 to yield ore at the rate of 300,000 tons a year. It is known as the Kursk magnetic anomaly because of the immense effect that it has on the magnetic needle. The Kursk ore carries up to 67 per cent. iron content and the ore layers average 200 feet thick.

HAY-FEVER pollens ride the winds over the Atlantic Ocean, but only for a relatively short distance off shore, was stated by O. C. Durham, chief botanist of the Abbott Laboratories, after examining vaselined glass slides exposed by Engineer J. W. Etchison, of the Pan-American Airways plane, *Yankee Clipper*, on a recent trip to Europe and return. Pollens were found at altitudes between 2,000 and 8,000 feet out to 275 miles off shore. Above 8,000 feet there were practically no pollens over either land or sea. Since the plane did not fly at lower altitudes when far off shore, the possibility still remains that pollens may be present "at the bottom of the air" farther out at sea than the slides showed.

CHROMOSOMES in growing grain have their numbers doubled when the seed is treated with a fungicide distributed under the trade name "Granosan," Dr. Dontcho Kostoff, of the Institute of Genetics at Moscow, has discovered. Seeds treated with the compound are not attacked by fungi, whereas seeds treated with colchicine are frequently killed by these parasitic forms.

TAKING the methods of major industries, the regional laboratories of the U. S. Department of Agriculture are installing pilot plants to determine the feasibility of new methods for creating industrial materials from farm products. The pilot plants will carry new developments through the doubtful stage where manufacturers, who depend on profits, are unwilling to venture. Often the laboratory shows that a certain process can be done in the test-tube stage, says Dr. W. W. Skinner, associate chief of the Bureau of Agricultural Chemistry and Engineering. What the pilot plant does is to prove the economies for potential large-scale, commercial production.

LETTING men and machines stand idle, while national consuming power cries out for the things they might produce, is a worse waste of national resources than stripped timberlands or soil erosion, according to a report of the National Resources Committee, under the editorship of Gardiner C. Means. "Manpower, potential work, is a perishable resource like water-power," the report points out. "Ten or fifteen million idle workers combined with idle machines can mean a tremendous loss in potential national income. In addition, the failure to use available manpower reduces the effectiveness of future production as idleness breeds frustration and loss of skills. The magnitude of losses from waste of manpower throws the wastes in the exploitation of natural resources into insignificance."