SCIENCE NEWS

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THE STORAGE OF RADIUM

IT is believed that a way may have been discovered to get around the awkward and hampering method of storing radium in solution. A new discovery, reported from Czechoslovakia, describes the use of silica gel as a dry "sponge" material in which radium can be stored for long periods without losing its effectiveness.

Most radium, it should be explained, is kept dissolved in the hospitals and other centers which may be fortunate enough to possess it. Elaborate pumps take off the gaseous disintegration product of this radium—the gas known as radon—which is sealed delicately into little metal containers called "seeds."

It has long been the hope that somewhere and somehow a dry material could be found which might serve as a more convenient storehouse for radium. A dry material could facilitate handling and shipment. Previously ferric hydroxide and comparable compounds of uranium and barium had been tried as a dry medium for storing radium. But, in all cases, the efficiency of the dry preparation was low, and it soon lost its emanating power.

L. A. Helwich, Czechoslovakian correspondent for *Industrial and Engineering Chemistry,* reports new work at the State Radiological Institute in Prague which shows silica gel overcomes past objections to a dry radium storing material. Tests show, he reports, that a dry compound of silica gel will keep 97 per cent. of its emanating power for years. Metals, such as magnesium, manganese, cobalt, aluminum and nickel—all in combination with iron—are used in the silica gel material to make the "sponge" for radium. Drs. P. Parchomenko and F. Behounek of the institute made the research investigation.

EFFECTS OF HEAVY WATER

DEATH or a faster life are the effects of drinking heavy water instead of ordinary water, depending upon amount of heavy water consumed. Dr. H. G. Barbour, of the Yale University School of Medicine, reported to the Ottawa meeting of the American Association for the Advancement of Science, experiments in which white mice die in about a week if all their ordinary drinking water is replaced by water whose hydrogen is the heavy or double-weight sort.

Ever since 1935 when the existence of heavy hydrogen was discovered, scientists have been wondering what would happen if a person drank heavy water instead of the ordinary natural kinds. When a European professor drank a small amount it made the headlines a few years ago. Until recently it was difficult to produce enough of the heavy water to use in large-scale experiments.

When animals like mice are kept only one fifth saturated with heavy water, they are not poisoned but their life processes are kept going at a faster rate, Dr. Barbour found. The heavy water stimulates the sympathetic nervous system, raising the hair of the animals as though they were frightened and producing pop-eyes. Dr. Barbour found that this effect is produced by heavy water protecting and preventing the decomposition of the epinephrine which is poured into the body, usually disappearing too fast to sustain these effects.

The growth of cancer in mice is slowed when the fluids of their bodies contain a fifth heavy water, but unfortunately for any possible use of this effect the mice do not survive so long as ordinary mice with the same tumors. A condition of catalepsy was induced in rats, cats and a monkey by direct application of deuterium oxide to the outside of the brain. This impairment of physical and mental action is the first effect of heavy water to be observed on an animal closely related to man.

WATSON DAVIS

OZONE AND ULTRA-VIOLET LIGHT VARIATIONS

IN the weather reports of a few years hence there may be a line running something like this: "Ultra-violet radiation increasing due to less ozone in the upper atmosphere; sun-bathers should expose themselves with care."

Predictions and records of ozone promise to be important not only to bathers exposed to sunshine but to physicians who use sunlight as medicine, farmers whose crops are influenced by sun energy, weather experts who must make forecasts and others.

To the Ottawa meeting of the American association, Dr. Brian O'Brien, of the University of Rochester, announced a new instrument that measures and records the ozone in the upper atmosphere. It may soon be standard equipment in weather stations in various parts of the world.

Ozone is oxygen in very active form and a very little of it has vast influence on the quality of the solar radiation that gets to the earth's surface. If all of it were eliminated from the air, all of us on the earth would be killed in a short time, so powerful would be the ultra-violet radiation that would be allowed to come to earth.

Yet all the ozone in the earth's atmospheric blanket, situated mostly at an altitude of 25 miles, would be sufficient to make a layer only two millimeters thick, about the thickness of two ordinary pencil leads. The ozone absorbs part of the solar radiation, the invisible ultra-violet area of the spectrum that lies in the neighborhood of Ångstrom units.

While it was assumed in early researches that the ozone was more or less constant in amount, new work indicates that it may vary from day to day and year to year. There may be clouds of ozone analogous to the clouds we see in the sky. These may affect weather, and knowledge of them may help the accuracy of weather predictions in the future.

The intensity of ultra-violet light is known to vary with the solar cycle, with more getting through to earth when sunspots are more numerous. Since we are now at about the peak of the sunspot cycle or a bit past it, bathers probably should expose themselves to the sun with greater care now than was necessary some years ago. Dr. O'Brien's ozone recorder measures the ultra-violet light, charts it upon motion picture film and allows a continuous record of the changes in the ozone layer in this way. Since it costs only

about $2,000 there is hope that these instruments can be scattered over the world at principal weather stations.

WATSON DAVIS

THE DANGER IN CANCER TREATMENT

THE patient is chiefly to blame in those cases of cancer in which treatment is started too late to effect a cure, it appears from a study reported by Drs. George T. Pack and James S. Gallo to the *American Journal of Cancer*.

Their conclusions are based on analysis of 1,000 cases, "random samples from the Memorial Hospital in New York City and the Lendrim Tumor Clinic of the Patterson General Hospital, N. J., during the past ten or fifteen years."

Asserting that "many cancers are curable if treated in time," these physicians set three months as the longest period that should elapse between the first appearance or discovery of possible cancer symptoms and the first visit to a physician. They call this reasonable delay; anything over three months is "undue delay."

In the cases they studied, the patients were responsible for nearly half of the delays before starting treatment. Patient and physician were both responsible for another 18 per cent. of the delays. The physician alone was responsible in 17 per cent. of the delays, and in about one fifth of the cases, 20.7 per cent., there was no delay.

In the case of the physician's responsibility, Drs. Pack and Gallo set one month as "ample time for a physician to make a diagnosis or refer the patient to a clinic." They analyze the physician's responsibility, however, on the basis of the action taken by the first physician the patient consults. The important thing is that he should recognize the seriousness of the condition and send the patient immediately to a cancer clinic.

Five types of error which physicians may make, with the result that the patient does not get treatment started until too late, are: wrong treatment; wrong advice; no treatment and no advice; acceptable treatment but with delay in referring the patient to a specialist when no improvement results; and inability to diagnose the condition within a month.

Ignorance of the seriousness of the first symptoms, fear, unwillingness to face the truth and sometimes financial circumstances are the reasons why patients delay seeking treatment.

NITROGEN AND WEIGHT GAIN OF CALVES

PRACTICAL results of great importance to the livestock industry may come from experiments at the University of Wisconsin, in which it has been shown that calves can gain weight on forms of nitrogen not supposed hitherto to be digestible and assimilable by animals.

The work was done by Professor E. B. Hart, H. J. Deobald and Dr. G. Bohstedt. They used four male calves. One of the animals was kept on a low-protein ration, as a control. Another was used as a second control, receiving a conventional ration of milk protein in addition to the low-protein ration. The other two received supplementary diets of simple nitrogen salts; the first getting ammonium bicarbonate and the second urea. These are the salts supposed to be of no value as stock feed. Yet the animals did gain weight on them, 105 and 110 pounds, respectively, in 14 weeks. This was intermediate between the small gain (65 pounds) shown by the low-protein calf and the high gain of 126 pounds by the calf receiving the milk protein.

What caused this gain is a physiological riddle for which the three experimenters do not at present venture an answer. It may possibly be that bacteria in one part of the calf's multiple stomach transformed the simple compounds into more complex ones, digestible by the animal. Then, when the bacteria passed on into another section of the stomach, digestion may have occurred in the ordinary way. But this explanation is as yet only conjectural.

It will be necessary to carry on more extensive feeding trials before the full economic possibilities can be developed. However, at least three lines of possible significance are indicated: (1) Livestock probably benefit from the increased nitrogen content which fertilization produces in pasture grasses, quite apart from their higher protein content and better yield. (2) The feeding value of the newly developed silage made from alfalfa plus molasses may not be seriously injured by the breakdown of part of its protein into ammonia compounds, through bacterial fermentation. (3) It may eventually be found practical to use such relatively simple nitrogen compounds as ammonium bicarbonate and urea to replace part of the higher-priced protein supplements in present-day stock rations.

SELENIUM IN THE SOIL AND VOLCANIC ACTIVITY

SELENIUM, the poisonous element named for the moon, that wreaks havoc on livestock in the West and may cause "rheumatism" in human victims, is the unwelcome gift to the soil of volcanic eruptions in the remote geologic past. This has been determined by investigators of the U. S. Department of Agriculture, working for several years on the difficult problem presented by stock poisoning occurring in certain parts of the West. Chemical analyses of soils from all over the world indicate that there is no soil entirely free from selenium, though relatively few soils contain enough to be dangerous.

The dangerously seleniferous soils in this country are found mainly in the Great Plains region. They were formed by the weathering of shales deposited during periods of intense volcanic activity when the Rocky Mountains were formed. The selenium was not placed directly in the soils by the volcanoes. The poisonous element was spewed into the air and brought down to earth by rain. The clays were subsequently buried and hardened into shale. Later, the shale beds were exposed again, and weathered back into soil. Analyses of soils from Hawaii indicate this air-to-earth route of volcanic selenium.

Selenium causes mischief to livestock when the animals eat plants that have absorbed the poisonous element from the soil. Not all plants absorb it equally. Two members of the pea family, a vetch and a loco weed, are especially serious offenders. Most native grasses, on the other hand, have very low selenium contents.

Animals native or long naturalized in a given region somehow learn that seleniferous plants are not good for them and come to avoid them. Unheeding immigrant ani-

mals are as a rule the principal victims. The first written record of selenium poisoning was made by Marco Polo in western China about 650 years ago—though of course he didn't know what it was. He only noticed "a poisonous plant growing there, which if eaten . . . has the effect of causing the hoofs of the animals to drop off. Those of the country, however, being aware of its dangerous quality, take care to avoid it." The present researches were conducted by Horace G. Byers, John T. Miller, K. T. Williams and H. W. Lakin, of the Bureau of Chemistry and Soils. It is reported in U. S. Department of Agriculture *Technical Bulletin* No. 601.

NEW WATER-PROOF TRANSPARENT WRAPPING FILMS

AN invention patented posthumously may bring marked changes in the transparent wrapping films industry. The new wrapping film, described in a patent just issued to the estate of Deane C. Ellsworth, Wilmington, Del., is a glass-clear, moisture-proof and water-insensitive material. It promises to find a wide variety of uses now performed by Cellophane and other similar transparent films.

The major new quality of the film, states the patent, is the fact that it can stand actual immersion in water for long periods without losing its moisture-proof properties. Present-day transparent films are moisture-proof to a large extent but can not retain this property long when in actual contact with water. In wrapping butter, cheese and other dairy products, moisture or wetness loosens the wax backing of the cellulose film and soon makes it unfit for service. That is why most butter is still wrapped in waxed paper and not in transparent films.

The late Mr. Ellsworth's patent, assigned to the E. I. du Pont de Nemours Company, is based on "the surprising and apparently irrational discovery . . . that a slight etherification of the cellulose caused wax coating compositions to adhere to the extent necessary to produce a desirable water-proof wrapping tissue. This discovery was all the more incredible because it was known at the time that partially etherified cellulose was more water sensitive than regenerated cellulose itself." Thus the etherification of the cellulose film enables the water-proof waxy compounds to stick tenaciously to it, and brings about a superior wrapping film. The Ellsworth patent, having 16 basic claims, listed in detail the preparation of 39 different formulae for making different kinds of water-proof film. Some of these films withstand a month of actual immersion in water before the water-proofing layer separates from the cellulose film back.

ITEMS

AN overlooked specimen in the Field Museum of Natural History has turned out to be a rarity, never before known—a fossil crocodile with horns. The horned crocodile fossil was collected by the Field Museum Paleontological Expedition of 1937 but its unique character was unnoticed during the collecting in the field. Only when the specimen was being prepared for exhibit did its extraordinary aspect come to light. A horned crocodile, states Henry W. Nichols, chief curator of geology, is more rare than a toothed hen, for while some prehistoric birds have been found to have teeth, there is no previous record that the order of Crocodilia ever possessed horns.

ULTRA-VIOLET rays, known to have great influence in bone formation, appear to be as influential in the growth of deers' antlers, from the researches of Professor N. Schuhmacher, of the University of Innsbruck. Professor Schuhmacher found that the antler growth of deer in the Austrian Alps was greatest in years showing the largest number of sunny days and average temperatures above normal.

LIGHT from different types of lamps in regular commercial use has quite different effects on the growth of plants, Dr. J. Voss, of the Kaiser-Wilhelm Institute, found, in experiments aimed at discovering the most efficient and economical source of artificial light for use in greenhouses. The best development of plants, he discovered, occurred under ordinary 500-watt nitrogen-filled metallic-filament lamps. Results almost as good were obtained with neon tubes. High-pressure mercury vapor lamps gave the plants a good start, but then permitted them to lag. Sodium vapor lamps produced inferior results, and the unfiltered rays of the quartz mercury-vapor lamp were definitely harmful.

ALTHOUGH the fires have not yet been extinguished, plans are already under way to salvage, in every possible way, all the burned timber in the great forest fires of the Pacific Northwest. Fifteen thousand, five hundred acres of land, containing 265,000,000 board-feet of timber with a normal value of about $400,000, have already been seared by the flames. But, although charred, much of this timber can be cut up and used if it is removed promptly before decay and before it is attacked by insects. Fred W. Johnson, commissioner of the General Land Office, has already issued instructions to regional foresters for prompt salvage of the timber and for quick reforestation. Much of the burned land is outside the National Park areas and is in revested Oregon and California railroad grant lands. These O & C lands, as they are known, comprise a total of 2,500,000 acres under the administration of the Department of the Interior.

LONG BEACH, Calif., has been pronounced the "oldest" of America's large cities, with San Diego a close second. These two are the oldest from the standpoint not only of the date of settlement but of the age of their residents. Statisticians of the Metropolitan Life Insurance Company report that almost one tenth—9.2 per cent.—of Long Beach's population is over 65 years old. In San Diego the proportion of residents over 65 years is 9.1 per cent. All the Pacific Coast cities have old populations. An equable climate and facilities for rest and recreation attract old people who have retired and are able to live on their income. For the same reason, the highly industrialized city of Gary, Ind., is the youngest of all the nation's cities of over 100,000 population. Only 1.7 per cent. of its inhabitants are over 65 years old.