SCIENCE NEWS

Science Service, Washington, D. C.

USES OF THE CATHODE RAYS

A NEW apparatus by which the waste products of petroleum stills and coke ovens may be quickly transformed into rubber, alcohol, acetic acid and valuable drugs and perfumes is announced by Professor H. Plauson, of Hamburg, Germany. The active agent is the cathode ray, which is produced in the ordinary X-ray tube, but which is here brought into the open, and made applicable to industrial processes on a large scale by Plauson's tube.

This, he claims, is more economical and efficient than that invented by Dr. W. D. Coolidge, the American physicist, in 1925. In the German tube the window through which the rays pass is of gold-plated beryllium instead of nickel. The current required is only 200,000 volts while Coolidge runs his voltage up to 350,000 or higher.

A further advantage claimed by Professor Plauson is that he is able to direct and focus the rays upon the chemical to be acted upon by placing it in a powerful rotating electromagnetic field which greatly enhances their activity. Under this influence moist air is converted directly into nitric acid. Ammonia is made from a mixture of nitrogen and hydrogen. The unusable gases given off in cracking petroleum to get the highest possible yield of gasoline can be combined with hydrogen or chlorine gas to form useful products. Synthetic rubber may be made from isoprene with astonishing rapidity. The milk from the rubber tree is quickly converted into a solid and insoluble state without the use of sulphur and becomes brittle if exposed too long to the rays. The liquid forms of bakelite are hardened into the solid shape without heating. With coal, water and air as the raw materials it is possible to make alcohol, methanol, acetic acid, ether and all such products as were formerly produced from vegetation.

Dr. Plauson says that the use of the cathode rays opens a new era in synthetic chemistry which is being actively investigated by the Laboratory of the Society for Ray Chemistry at Hamburg.

VOLCANO EXPLOSIONS AND WORLD WEATHER

WEATHER men as well as volcanologists are watching with heightened interest the series of volcanic eruptions which have been taking place this summer, culminating with the explosion of Rokatinda, which is reported to have killed a thousand natives on the island of Paloweh. If the recent eruption was severe enough, or if it is followed by an even greater outburst, there is a chance that the following summer may be abnormally cool.

Professor W. J. Humphreys, of the U. S. Weather Bureau, has made a study of the weather records following periods of intense volcanic activity for the past three centuries, and finds that each great explosive eruption has been followed by one or more cool, cloudy summers. The famous "year without a summer," 1816, followed upon the heels of a terrific explosive eruption of Tomboro volcano, in the East Indies, during 1815. This correlation between volcanic eruptions and weather is believed to be due to the loading of the upper atmosphere with clouds of extremely fine volcanic dust, which stays aloft for months and is carried all over the world.

Volcanic eruptions of the explosive type show a tendency toward grouping. Two or more will occur close together within a couple of years, and then there will be a period of relative quiet until the next group outburst. Thus, one of the earliest group entries on Professor Humphreys' list shows the eruption in 1766 of Hecla in Iceland and Mayon in the Philippines; the latter volcano is in eruption again at present. Between 1783 and 1785 occurred the eruptions of Asama in Japan, Skapta Jokull in Iceland and Vesuvius in Italy. In 1799 there was an isolated volcanic explosion on Tierra del Fuego, off the tip of South America, which may have been responsible for a cool summer following.

From 1808 until 1815 there was a long succession of great outbursts: St. George in the Azores, Etna in Sicily, Soufriere on the Island of St. Vincent, Mayon in the Philippines, culminating in the terrific eruption of Tomboro, which destroyed 56,000 lives. The "year without a summer" followed in 1816; but during this period there were several years of abnormally low temperature.

Fifteen years later, in 1831, a new series began, with explosions in the Babuyan Islands, Mt. Coseguina in Nicaragua and Awatska in Kamtchatka. There followed a long period of relative freedom from great explosions, ending in 1872 with an eruption of Vesuvius, followed by Marapi in Java and Vatna Jokull in Iceland. This series ended in 1875.

In 1883 came the most terrific eruption in the memory of living men, when the great East Indian volcano Krakatoa shattered the whole island on which it stood and wiped out 36,000 Malay lives. This eruption was followed before 1886 by outbursts of St. Augustine in Alaska and Tarawera in New Zealand. The low-temperature period following this group was second only to that of 1816.

The next period was between 1890 and 1892, with explosions of Bogoslov in Alaska, Awoe, in the East Indies and Bandaisan in Japan. Ten years later came the disastrous eruption of Pelée on the island of Martinique, and the outbursts of Santa Maria volcano in Gautemala and Colima in Mexico.

The most recent group of eruptions started in 1912, when Katmai in Alaska blew off its top, followed in 1913 by another eruption of Colima, and in 1914 by Sakurashima in Japan.

The present year has been marked by four volcanic outbreaks. Ometepe, on an island in Lake Nicaragua, erupted in January. There have been reports of explosions at Krakatoa, quiescent since its great eruption in 1883. Mayon in the Philippines has been driving the

inhabitants of its neighborhood away from their homes, and finally has come the destructive explosion of Rokatinda. None of these has been at all comparable with the great explosions, such as those of Krakatoa and Asama, or even with the eruption of Katmai; but there is no telling whether they may not be merely the preliminary bouts of a really huge outburst, which may again bring us a year without a summer.

COAST GUARD EXPEDITION DISCOVERS BIRTHPLACE OF ICEBERGS

ACCORDING to an amateur radio message from Godhavn, Diske Bay, Greenland, the birthplace of the icebergs that menace the transatlantic steamers has been discovered by the oceanographic expedition of the U. S. Coast Guard on board the SS *Marion*. The ship is now well above the Arctic Circle and has just proceeded across Diske Bay between hundreds of towering ice islands.

"We are now viewing the birthplace of the icebergs of the North Atlantic, the entrance of Jacobshavn Fjord which is literally jammed with thousands of bergs so close that we can not penetrate with the vessel," Commander Edward H. Smith, in command, explained in his report to Science Service.

The *Marion* on its voyage northward in Davis Strait between Labrador and Baffin Land on the west and Greenland on the east has noted the number of icebergs. The scientific men aboard have also charted the ocean currents that bring the icebergs southward to endanger the steamship tracks. The contour of the sea floor that sometimes allows the great ice masses to ground and be delayed in their southward journey is also being investigated.

Commander Smith will shortly head a landing party that will investigate the Greenland ice cap at this point. The rate of movement of the glaciers that drop the icebergs into the sea will be measured. New knowledge of the rate at which icebergs are born of the ice cap is expected as a result of these studies.

CANCER CONTROL BY BLOOD ALKALINITY

CANCER is associated with and possibly controlled to a large extent by the relative alkalinity of the blood. This discovery was made by Dr. Ellice McDonald, chairman of cancer research of the University of Pennsylvania, in an address given at Evanston on August 11 before the American Chemical Society Institute.

Dr. McDonald flatly rejects the germ theory of cancer. At the same time he discounts the idea that cancer cells are of some abnormal species foreign to the human body.

A cancer cell is simply an ordinary body cell which is compelled to live in the wrong liquid environment. The trouble in such liquid medium comes mainly from excess of alkali, coupled at the same time with a low content of calcium in the blood—two factors closely interrelated.

The much-disputed radium and X-ray treatments for cancer are successful, in a limited number of cases, mainly in so far as they reduce the alkalinity of the blood. Experiments have demonstrated an appreciable rise in hydrogen-ion concentration—that is relative quantity of acid in the blood—following irradiation. It is still not clearly demonstrated how or why the powerful rays should succeed or fail in a given case.

'Tis an ill wind that blows nobody good. People cursed with "acidosis" are found by Dr. McDonald to be practically immune from cancer. The blood of such individuals, who are usually of sedentary habits, may reach the figure of 7.2 on the biochemist's scale of acidity. A victim of cancer, however, would show a record of about 7.45. Simply expressed, the latter figure means nearly double the alkalinity (or half the acidity) of the value for the former case.

It is likely that families cursed with cancer are composed of persons sharing a family tendency to run low in bodily acid and high in alkali. It is accordingly quite unnecessary to suppose that the actual disease itself may be inherited. Only the tendency is passed on.

When a body cell finds itself in an abnormally alkaline environment it simply acts like a yeast cell. It grows. Its cell wall expands and becomes more permeable. It divides, and great increases in number and mass occur. As with yeast again, the addition of sufficient acid stops the irresponsible, wild growth of the cells.

Dr. McDonald's work, supported not only by his Philadelphia staff, but also by the recent biochemical discoveries of Rene Reding of Cancer Center, University of Brussels, have thrown a large part of cancer research into the hands of the chemists. Search for new substances capable of correcting abnormal alkalinity is now projected. It is probably not sufficient merely to administer doses of some common acid to a cancer patient. It will be necessary either to attack chemically the fundamental source of alkali, or to foster acid production; these may be one and the same thing. With this will be joined an investigation of new calcium salts suited to the maintenance of decreased alkalinity.

RADIOVISION

RADIOVISION and radiomovies will be received in thousands of homes during the coming winter. Thousands of amateurs and radio enthusiasts will build their own radiovision receivers and early this fall ready-made radiovisors will come on the market. Radiovisors will be the novel and really smart Christmas gift this year. These are the predictions of those behind the scenes in radio experimentation.

Although only three radio stations are regularly broadcasting radiovision or radiomovies, at least seven more are experimenting or testing and installing radio transmitters. The fall months will see this number increased rapidly.

At present most of the radiomovies are in pantomime only but increase in "picture quality" will come with experience and perfection of transmitting methods. The recent assignment by the Federal Radio Commission of

new and wide bands of short waves for radiovision will spur on the development.

At present radiovision is in a state corresponding to the crystal set days of sound radio in 1921. But the growth of radiovision will be faster than was the growth of sound radio. Thousands have learned to use tools and make their own radio sets. The vogue of home construction of radio sets has waned because it became unprofitable and uninteresting with the growth of the radio industry. Now the latent mechanical urge of the radio fan is likely to be liberated by radiovision and the construction of radiovisors is likely to become a new home occupation.

The well-organized radio set manufacturers, alert for new things to sell, are also expected to place de luxe radiovisors on the market in a remarkably short time this fall.

In the early days of radiovision only the expert amateurs and set builders are likely to obtain consistent and satisfactory results because of the fact that most of the radiovision broadcasts are now on wave lengths shorter than the usual music and speech broadcasts. Their pioneering, however, will make the day of radiovision in the ordinary parlor come sooner.

ITEMS

"No free samples!" was the caution to the audience at the Institute of Chemistry of the American Chemical Society meeting at Evanston, Illinois, when they were shown various types of synthetic gems by Frank B. Wade, of Indianapolis. Mr. Wade reviewed the history of the making of gems, from the first much-disputed rubies from Geneva in 1885 to the present time, when chemically genuine rubies and sapphires have become commonplaces of the market, and even the most prized of all sapphires, the clear blue, can be produced at will.

If a cow's milk hasn't any iodine in it, this important substance may be put into her milk by feeding her a ration that contains iodine, according to experiments carried out at the Wooster Agricultural Experiment Station. Theoretically, milk contains iodine. Practically, it does not always. Potassium iodide, calcium iodide and a seaweed were fed to cows in the experiment. These cows had produced milk without iodine, but the addition of iodine in any of the above forms caused the appearance of this substance in their milk. In sections where the feeds are rich in iodine the milk contains small amounts as a normal constituent, but in sections where the feed is poor in iodine, it will be absent from the milk unless fed supplementally.

The man with heart disease, except in very advanced stages, need not be afraid that an accident, either a minor one such as tripping over the rug or a major one in which he falls or is thrown, will affect the function of his heart, causing increased weakness or failure. Dr. W. I. Clark, of Worcester, Mass., reports that as a rule accidents do not affect a diseased heart, and there does not seem to be any special type of accident which is invariably followed by heart failure. Certain exceptions do occur in which after an accident the heart may show signs of failure which persists and progresses. These cases are found especially among older workers who have heart trouble or who are on the verge of heart failure anyway.

A new instrument like the ticker of stock brokers' offices, in which the action current of the heart doubles for an electric current, is now being used by physicians to measure the heart beat, instead of the old-fashioned method of counting the pulse with hand and watch. The new instrument, called cardiotachometer, is much more accurate than the old method and can be used to measure the pulse rate under all sorts of conditions of exercise and rest. A pair of electrodes, fastened on the lower left and upper right chest, pick up the current generated with each heart beat, which passes through an amplifier and is recorded by a signal recorder which marks each beat on a moving tape. The instrument was designed by Dr. Ernst P. Boas, of New York City, in collaboration with Dr. Benjamin Liebowitz and Dr. Alfred N. Goldsmith.

When the ship begins to pitch and roll and you feel waves of seasickness overwhelming you, try a salt-water bath. The water should be from 90 to 95 degrees Fahrenheit, its specific gravity 1.020. Lie in the bath with your eyes blindfolded, your body supported lightly at shoulders, buttocks and back of head, with the toes just touching the end of the tub to keep the legs from floating. Stay in the bath for a half hour, an hour, or longer if necessary. This procedure gives great and usually permanent relief within a short time. This method of treatment was worked out by Dr. R. A. Bennett, who used it in extreme cases where exhaustion from seasickness was becoming dangerous. The bath moves as the ship does, but the water has not time to respond to the motion, so it and the patient immersed in it remain fairly motionless.

Small boys, getting aching backs and no fun at all hunting potato bugs in the parental potato patch, may well sigh for the company of a few Southern quail. N. L. Wiley, of Beaufort, N. C., states that he has observed these beautiful little game birds eating potato beetles. They seem to be about the only birds that will condescend to such a diet, for even ducks and guinea fowl, which will ordinarily eat anything they can get into their beaks, refuse to touch them.

Borax has had another use added to the long list of things it is good for, by Professor Robert Matheson and E. H. Hinman, of Cornell University. They have discovered that a concentration of one and one half parts in a thousand of water is very quickly fatal to the larvae, or "wigglers," of mosquitoes that breed in rainwater barrels, cisterns and other exposed reservoirs. The borax seems to hold its larva-killing properties for a long time; one experiment ran from July 25 to September 7 of last year without any signs of weakening at the end.