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PAPERS AT THE INDIANAPOLIS MEETING OF THE AMERICAN CHEMICAL SOCIETY

ATOMS whose weight-bearing cores contain even numbers of both electrons and protons are twenty times more frequent than all others, Professor William D. Harkins, of the University of Chicago, reported to the American Chemical Society, meeting at Indianapolis this week. Of all the chemical elements found on the earth, said Professor Harkins, 95 per cent. belong to a class in which each building stone of the atomic core has a mate. The electrons of a pair in the central heart of the atom are not absolutely identical, however. One is spinning in the opposite sense to the other. Thus the nucleus as a whole is free from spin. These facts throw important light on the stability of atoms and therefore on the reason why some chemical elements, like radium, are continuously disintegrating into simpler atoms.

NOT enough atom-forming collisions occur in the depths of space to account for the intensity of penetrating cosmic radiation observed here on the earth, according to Dr. L. S. Kassel, of the U. S. Bureau of Mines at Pittsburgh. The theory of Dr. R. A. Millikan and Dr. G. H. Cameron, of the California Institute of Technology, that atom-building is the cause of the ultra-X-radiation that streams down into the earth's atmosphere from above, would require that in the formation of an iron atom, for instance, 28 electrons and 56 protons or hydrogen atom cores would need to meet at the right time. Dr. Kassel asserted that collisions occur ten million billion times too seldom for this. His calculation, however, is based only on the building of iron atoms, one of the many kinds of atoms which may, during their formation, give rise to penetrating rays.

COAGULATION or clotting of the liquid protein substances of brain and sensory nerves is the cause of the action of common anesthetic drugs. A challenge to the chemist is contained in this statement by Professor W. D. Bancroft, of Cornell University, to the American Chemical Society. Practically nothing is known about the nature or the properties of these animal proteins. Different proteins occur in different parts of the nervous system for suitable drugs can cause jellying of one region while leaving others untouched. Veronal causes reversible coagulation of the brain proteins without affecting the sensory nerves. Histamine coagulates the proteins of the sensory nerves. Curare causes partial clotting of the motor nerves, while potassium salts affect the proteins of muscle. Professor Bancroft's report was presented jointly by himself and Drs. J. H. Richter and J. E. Rutzler, also of Cornell University.

EXPERIMENTS designed to test whether canned foods can be used as the sole source of vitamins A, B and C, have shown that laboratory rats and guinea-pigs fare excellently on a diet consisting solely of canned goods. The experiments were made by Dr. E. F. Kohman, of the National Canners Association; Professor W. H. Eddy, of Teachers College, Columbia University, and Celia Z. Gurin. A balanced diet of four or five canned foods was fed for five days to the animals, who were allowed to use their own discretion in eating them. After the end of each period of five days a change was made to a new dietary combination. Three generations of rats and guinea-pigs have thus dined on 74 combinations of 49 canned articles, and are now in better health than other animals fed on the usual laboratory stock fresh diets. Previous trials of this kind have tested the deficiency of a particular vitamin in a special foodstuff, and have not sought deficiencies which made themselves felt in later generations. Extremely varied and balanced diets of the kind used in these experiments have failed to give evidence for the belief that canned foods can not supply all dietary wants.

PHOTOGRAPHS of individual explosions in a gasoline engine were shown by Dr. Lloyd L. Withrow and T. A. Boyd, of the General Motors Research Laboratories. Much interest was caused by their report that "the products of combustion continue to emit light for some time" after the main burning process is over. Before this happens a narrow sheet of flame travels steadily through the charge and most of the burning takes place in this zone. The brightness of the afterglow increases with increasing pressure of the gases during the explosion. The method has been used to identify and study "knock" in auto engines.

IMPROVEMENT of a chemical test which will make detection of drunkenness by breath analysis more accurate was reported by Dr. Rolla N. Harger, of the Indiana University School of Medicine. Previous attempts to estimate the concentration of alcohol in the body by analyzing the breath have given quite erratic results. This is probably because the breath analyzed was not always air from the alveoli or air-cells in which exchange of oxygen and carbon dioxide between the blood and the lungs takes place. By the new method, the alcohol and carbon dioxide contents of the breath are determined simultaneously. Since the carbon dioxide content of alveolar air is constant, this gives a means of estimating the alveolar alcohol in any sample of breath. This method was used on a number of intoxicated subjects and the alcohol figures so obtained agreed well with the concentration of the alcohol in the blood determined directly.

PERIODS of rest or temporary abandonment of effort are quite essential to the successful research worker, according to Washington Platt, of the Borden Company, Syracuse, New York, and R. A. Baker, of the College of the City of New York. Several hundred research workers and directors of research had answered questions as to conditions which are favorable or unfavorable to efficient research. The majority agreed that "problems

may be solved when the mind is on the fringe of consciousness.'' The mind must be provided with facts, but periods of temporary abandonment of creative effort are also quite necessary.

PAPERS AT THE BALTIMORE MEETING OF THE AMERICAN COLLEGE OF PHYSICIANS

A NEW test for heart efficiency was reported by Dr. Allen Eustis, of New Orleans, to the American College of Physicians in session at Baltimore, on March 24. The test is a valuable aid in the diagnosis and study of the type of heart disease known as myocardial insufficiency. The test may also be used with caution in cases of marked enlargement of the heart, angina pectoris and certain cases of high blood-pressure. By means of this test the physician will have a new gauge of how well the diseased heart can function. The test depends on the rise in the systolic blood-pressure following an increase in pressure within the chest caused by forcible expiration of the full breath under a definite amount of pressure. Dr. Eustis reported that clinical evidence corroborated the results of the test.

HOW chemicals known as nitrates act to relieve the agonizing pain of the angina pectoris was discussed by Dr. Alex M. Burgess, of Providence, Rhode Island. From a large series of studies of normal and diseased hearts Dr. Burgess concluded that the action of the nitrates in increasing circulation in the coronary arteries is what relieves the excruciating pain. The cause of the pain in ambulatory angina, the type in which the patient is up and about, is probably an insufficient blood supply due to disease of coronary arteries. Pain of the heart occurs when the degeneration of old age develops usually between the ages of 50 and 60 years, Dr. Alexander Lambert, of New York City, said. It comes when the degenerated heart muscles are inadequate to respond to the circulatory demand for increased heart output per beat. Use of oxygen in heart disease by a specially devised oxygen chamber or tent which keeps the temperature and the humidity at a comfortable level was described by the designer of the apparatus, Dr. Alvin L. Barach, of New York City.

EVIDENCE that there may be epidemics of hyperthyroidism, commonly known as goiter, was presented by Dr. William Carpenter MacCarty, of the Mayo Clinic. Dr. MacCarty's report was based on a study of over thirty thousand goiters, made during the past twenty years by his staff at the Mayo Clinic. Beginning about 1921, an increase of enlarged thyroid glands was noted. It is this increase which suggests the possibility of epidemics of hyperthyroidism. A classification of goiters which would enable practicing physicians to determine the form of the enlarged gland by examination of the neck was given by Dr. MacCarty. Two thirds of all the goiters examined during the twenty-year study fell in one class.

THYROID extract need not be given in treating most cases of obesity or overweight, Dr. Frank A. Evans, of Pittsburgh, said at a symposium on the glands of internal secretion. Instead, Dr. Evans recommended a diet of between 400 and 600 calories on which the too-fat patients lose weight rapidly. They may be kept on these diets for months, if necessary, with nothing but improvement in their bodily condition. These patients feel better and have increased resistance to fatigue and they are contented with the diet. Thyroid extract should not be given because, among other reasons, it may disturb this feeling of contentment and well-being, and thus discourage the patient with the dietary régime on which he was improving.

AN extract of pituitary gland is often a powerful remedy for relieving the distressing thirst of diabetes insipidus, Dr. Thomas B. Futcher, of Baltimore, said. This extract may be given by hypodermic or as a nasal spray. Diabetes insipidus is not to be confused with diabetes mellitus, the disease in which the body is unable to store and burn up sugars. In diabetes insipidus there is no excess of sugar in the urine, but great thirst, a voracious appetite, weakness and emaciation are symptoms of the disease. Injury to a newly-discovered meshwork of nerve fibers lying partly in the pituitary gland and partly in the neighboring part of the brain is probably the cause of diabetes insipidus, according to present theories, Dr. Futcher explained.

THE vital hormone of the cortex of the adrenal glands, which has saved the lives of patients suffering from hitherto fatal Addison's disease, was described by Dr. Frank A. Hartman, of Buffalo, one of the investigators who prepared the extract containing the hormone.

LIQUOR was absolved from blame as being the chief cause of cirrhosis of the liver by Dr. A. M. Snell, of the Mayo Clinic, Rochester, Minnesota. Dr. Snell said that, contrary to generally accepted opinion, alcoholism caused cirrhosis in only half the cases of the disease. Furthermore, cirrhosis appears in only five per cent. or one twentieth of all alcoholic individuals. The outlook for the patient suffering from this highly fatal disease is better now than it was ten years ago, but it is still serious, particularly for advanced cases. Physicians are trying now to recognize the disease in the earlier stages when it may still be cured. Some of the early symptoms may be indigestion, weakness, vague abdominal pains and occasionally painless jaundice. Dr. Snell reported good results are obtained in some cases by newly devised operations for controlling bleeding from enlarged veins in the gullet that are invariably present in cirrhosis.

CARBOHYDRATES, the sugars and starches of the diet, are of outstanding value in the diet of animals suffering from extensive liver disease, Dr. J. L. Bollman, also of the Mayo Clinic, reported. He found that a diet rich in sugar and starch will protect the liver from damage by poisons and will aid in its recovery after such injury. The liver plays an active part in the coagulation of the blood. This is shown by the fact that hemor-

rhage does not occur when the liver condition improves, although the veins may remain distended.

ITEMS

ICEBERGS will invade the North Atlantic to the number of about 310 during the coming season, is the forecast of Lieutenant Commander Edward H. Smith, of the U. S. Coast Guard. Commander Smith has for several years made a special study of ice conditions, and has worked out a method of forecasting which he believes will be of great value to the International Ice Patrol in its work of protecting transatlantic traffic during the iceberg season. The number of bergs anticipated for 1931 is not exceptional. The maximum recorded during the modern period of intensive study and reporting of icebergs was for the year 1929, when 1,300 came down out of the North. The lowest figure was for 1924, when only eleven were reported.

THE newly discovered faint speck of light in the heavens has been sighted through the 26-inch telescope of the U. S. Naval Observatory and pronounced an asteroid or minor planet. Mr. H. E. Burton, astronomer, determined the position of the rapidly moving object and Messrs. William M. Brown and John E. Willis, of the U. S. Naval Observatory staff, completed a preliminary computation of the object's orbit or path in the heavens. Two German astronomers, Schwassmann and Wachmann, of Bergedorf Observatory, near Hamburg, who have won fame for many such discoveries, made the announcement of the discovery of the asteroid.

THE "electric sign of the sky," a star flashing out brightly every 100 minutes, has been discovered by H. van Gent, of the Leyden Observatory. The discovery was made while Mr. van Gent was performing research at the Union Observatory, in Johannesburg, South Africa. Many variable stars, which regularly change in brightness, are known and studied by astronomers, but this one, which is in the southern constellation of Puppis, part of Argo, the ship, changes more rapidly than any other known variable. Usually the period is a matter of days.

STUDY of flax by botanical and chemical methods shows that it contains a valuable wax. Linen and linseed are the commercial products now produced from flax. To the Institution of Chemical Engineers, in London, Dr. W. H. Gibson has reported that flax wax is nearest in character to beeswax, but has a distinctly higher melting point. It is somewhat harder and more brittle. For these reasons it gives an extremely high polish, and the film is stated to be more durable than that given by carnauba, the tropical palm wax most used in high-grade polishes. Dr. Gibson estimated that in the Belfast area of northern Ireland possibly 1,000 tons of flax dust could be obtained per annum, from which about 60 tons of flax wax could be secured.

FISHES that have taken to living mostly on land because they can't breathe in the water that is available to them, were among the curiosities described by Professor A. S. Pearse, of Duke University, before a joint meeting of the American Society of Zoologists and the Ecological Society of America. There are a number of fish species that live in the shallow waters of the Oriental tropics. They spend a great deal of their time as air-breathers, scrambling around on land and even climbing up on the low vegetation of the shores. Sometimes they get more or less mythical reputations as tree-climbers. It has usually been assumed that these fishes have developed their ability to breathe air because their pools periodically dry up. But Professor Pearse suggested that they may be forced to leave the water because it is so stagnant and warm, and so teeming with other, smaller animal life, that it simply does not have enough oxygen left in it to keep the fish alive by means of the gill respiration which all orthodox fishes are supposed to depend on.

CHESTNUT forests now dead or dying from the blight can be salvaged twenty years hence for the tanning and paper industries, a recent report by the paper section of the Bureau of Standards of the U. S. Department of Commerce states. Despite efforts to introduce blight-resisting trees from Asia into this country, this spread of the disease together with the commercial exploitation of the chestnut by the tanning and paper industries indicates the ultimate exhaustion of American chestnut forests. The day when a shortage will be felt has been postponed by many years, however, through the discovery that dead trees can be used as a source of paper and tannin. Investigations conducted by the Bureau of Plant Industry, U. S. Department of Agriculture, have revealed that dead trees suffer no appreciable loss of tannin even over long periods of time. It has also been demonstrated that dead trees can be used in paper manufacture and a paper-board mill has been recently built in the worst blight-infected territory with expectations of using the trees for twenty years.

THERE is less oxygen in the water of the Pacific Ocean than there is in Atlantic Ocean water. There is more oxygen in the water of great deeps of both oceans than there is in water from moderate depths. These are among the discoveries made by Dr. Erik G. Moberg, of the Scripps Institution of Oceanography, after a chemical study of thousands of samples of ocean water. Since all plant and animal life in the ocean is dependent on oxygen no less than is life on land, such studies as Dr. Moberg's are of fundamental practical as well as theoretical importance. Dr. Moberg found the greatest oxygen content in Pacific Ocean water at the surface. Here the water was nearly saturated with oxygen. The content fell off in samples taken from increasing depths, until at about 2,000 feet there was less than one part of oxygen per thousand of water. From this depth onwards the oxygen content increased again, reaching its highest point at the bottom. The highest deep-water oxygen ratio found was 3.45 parts per thousand of water.