SCIENCE NEWS

Science Service, Washington, D. C.

PAPERS READ BEFORE THE NEW ORLEANS MEETINGS OF BIOLOGICAL SOCIETIES

THAT starvation treatment of wildly growing cancer cells, causing them to turn toward normalcy, has been accomplished in test-tube experiments, was announced by Drs. Richard H. Steckel and John R. Murlin, of the University of Rochester. This change from cell activity characteristic of cancer toward normal activity was made by starving the cancer of sugar through the use of insulin, the remedy for diabetes. The results, however, seem to be an important advance in the chemical attack on cancer. Changing the diet on which cancer thrives brought about this hopeful effect.

Slices of cancer from a rabbit were grown in blood from another rabbit that had been thrown into insulin shock by large doses of the diabetes remedy, such as are being used in insulin shock treatment of mental disease. This blood, as a result of the insulin treatment, is deficient in sugar. Its effect in reversing the cancer toward normal was explained in the following statement: "Unlike normal cells, tumor cells get their energy principally from fermentation of glucose to lactic acid instead of complete oxidation of the sugar. This was shown by Professor Otto Warburg, German Nobel laureate, and associates as early as 1923. Many attempts have been made to restore normal metabolism and thereby 'burn out' the tumor. Professor Warburg himself and many others used insulin on tumor-bearing animals, but with no clear indication of success. Recently this laboratory has undertaken the use of insulin in a different way, on the hypothesis that it should discourage the tumor's growth by: First, starving it of sugar for glycolysis and, second, promoting oxidation of sugar. The present experiments show merely that tumor slices placed in hypoglycemic (sugar deficient) serum have their oxidative metabolism markedly increased and the fermentation metabolism greatly diminished. Both are changes in the direction of the normal. The Brown-Pearce transplantable carcinoma of the rabbit was used and only young vigorously growing tumors chosen. Slices from the same tumor were studied simultaneously in serum from normal rabbit and from the same rabbit after being thrown into insulin shock. The effect on fermentation probably is due wholly to the lower blood (serum) sugar but the effect on oxidation may possibly be the result of a combination of factors. The experiments offer no proof that insulin will cure or prevent human cancer."

A NEW kind of double vaccine which gave "solid immunity" or resistance against several strains of influenza virus on its first trials was announced by Drs. Frank L. Horsfall, Jr., and Edwin H. Lennette, of the Rockefeller Foundation, New York. Up to the time of their departure for this meeting there was no evidence that efforts to produce the complex vaccine in a form suitable for protecting human beings against influenza would be successful. The success reported was in vaccination of ferrets. It is hoped that the work now under way at the laboratories of the Rockefeller Foundation's International Health Division will succeed, and that hope is based on the particular make-up of the new vaccine. The vaccine is a double virus vaccine. It was made by grinding up the lungs and spleen of ferrets that had been given influenza by injections of "flu virus" or germs. By accident, these ferrets got distemper at the same time they were given influenza. That may turn out to have been a lucky accident, because neither influenza virus nor distemper virus alone could be made into a successful anti-influenza virus. The complex nature of the vaccine, which is its strength, may be its weakness when it comes to vaccinating human patients. Neither Dr. Horsfall nor Dr. Lennette would take the risk of injecting ferret lung and spleen tissue. So they are trying to get the two viruses, influenza and distemper, to grow together on the membranes of developing chick embryos, or if that fails, to grow them separately and then mix them into a vaccine. Animals other than ferrets were not protected by the new complex vaccine. This may have been because the vaccine was given to animals that are not susceptible to distemper. It is not yet known whether man is susceptible to distemper. But this may not make any difference so far as the success of the new vaccine is concerned, because it is not certain whether it was lack of susceptibility to distemper virus that caused its failure in animals other than ferrets.

BLEEDERS, from new-born babies to patients on the operating table and even, in many cases, hemophiliacs suffering from the hereditary bleeding disease, can now be saved by two substances presented by Dr. H. P. Smith, of the State University of Iowa. One of the anti-bleeding substances is a new preparation so powerful that when sprinkled on a wound it stops bleeding by clotting the blood "in the twinkling of an eye." It is obtained from beef blood at the slaughter house which, after preliminary treatment, is whirled in apparatus like a cream separator. The fluid that separates out, called blood plasma, is diluted with water, treated with acid and other chemicals to purify it and finally sterilized by filtering through cakes of ground glass that is partially fused together. This material is so fast in action it will clot blood in one second. It is not yet on the market and the supply is still limited, but surgeons at the University of Iowa have already used it, with "quite encouraging" results, to stop dangerous oozing of blood during major operations. This oozing, which is difficult if not impossible to stop by other methods, is especially troublesome in operations on the brain, liver and bone. When the material is available generally, dentists will also be able to use it to stop bleeding after teeth are drawn. For hemophiliacs, like the Spanish Count of Cavodonga, who recently bled to death from injuries following an automobile accident, the new thrombin may prove life-saving. It can not stop internal bleeding, but in many cases hemophiliacs bleed to death from cuts on the surface of their bodies. This bleeding can be stopped

by the new thrombin. Thousands of new-born babies and older patients suffering from obstructive jaundice can be saved from bleeding to death by the other substance that Dr. Smith discussed, vitamin K. This vitamin not only stops bleeding but if used properly will prevent bleeding. The vitamin was discovered by Professor H. Dam, of Copenhagen. Its chemical identity was determined and it was prepared synthetically at the St. Louis University and the University of California. It was first used to treat patients by Dr. Smith and by physicians at the Mayo Clinic. A "bedside" test for determining when to use vitamin K to prevent bleeding was described by Dr. Smith. He urged doctors to use this test on patients who might bleed, so that the vitamin can be given in time to prevent the bleeding. For new-born babies, one out of every two or three hundred of whom are in danger of bleeding, vitamin K can be given during the first few days of life. The second to the fourth days are the danger period for these babies. Physicians at the Johns Hopkins Hospital in Baltimore, in Virginia and in New York are giving the vitamin to the mothers before the babies are born, to prevent the bleeding in the babies.

FOUR physically healthy American young women were given the first stages of the Oriental deficiency disease, beriberi, in diet experiments reported by Drs. R. D. Williams, H. L. Mason and R. M. Wilder, of the Mayo Foundation. They were given the disease by a diet almost completely lacking in vitamin B_1, or thiamin. Polished rice, sugar, tapioca, white bread, cornstarch, white raisins, egg white, cottage cheese and American cream cheese, butter, black tea and cocoa were the foods they ate for twenty-one weeks. Mental depression, lack of appetite, digestive disturbances, disturbed heart action and occasional tenderness of the muscles of the calves of the legs were the symptoms they suffered on this diet. All the symptoms disappeared promptly when they were given thiamin or vitamin B_1. Within a few hours they felt better and were hungry for food that had previously been nauseating. The severe neuritis and swelling characteristic of beriberi did not afflict these young women. This led one doctor to comment that if while on the diet they had gone to a doctor who did not know about the diet, their symptoms would have been diagnosed as neurasthenia or chronic nervous exhaustion. Many patients, it was suggested, may be suffering from lack of this vitamin. A patient suffering from what used to be called alcoholic insanity was also put on the same diet. His mental symptoms were all made worse, but he improved when vitamin B_1 was given to him. This condition, it is now known, is due to lack of the vitamin rather than to the alcohol.

A NEW vitamin, member of the large family of B vitamins but one whose existence has never before been suspected, was presented by Drs. A. G. Hogan, L. R. Richardson and Homer Patrick, of the University of Missouri. This vitamin, which has not yet been identified, is provisionally labeled vitamin B_p. It is concerned with the development and shape of bones. Without this vitamin in their diet, the bones of chicks are shorter and thicker than normal, and the chicks develop the disease known as slipped tendon or perosis. Existence of the vitamin has been so recently discovered that its exact significance, other than for prevention of perosis in chicks, is still a matter of speculation. "Since it is concerned with the bone development and conformation of the chick, it may also be concerned with the structural development of other animals, and of man himself." The new vitamin was discovered in studies of the slipped tendon disease of chicks. The chemical, manganese, had been established as a preventive of this condition when fed liberally to chicks. By making an investigation of chicks that developed the slipped tendon condition, even on diets well supplied with manganese, and by studying the vitamin B food source in their diet, the existence of the new vitamin was discovered.

HOPE for high blood pressure and stomach ulcer patients appeared in discoveries announced at the meetings. For the stomach ulcer patients there will be the new hormone urogastrone, obtained from kidney excretions. Drs. A. C. Ivy, E. Wiezcorowski and J. S. Gray, Northwestern University Medical School, reported that the first trials on ten normal persons showed that this hormone can stop the formation of acid by the stomach. At present, ulcer patients must take alkaline powders to neutralize the acid in their stomachs so that it will not irritate the ulcers and cause bleeding. The new hormone will be injected under the skin. Such injections at present cause swelling and reddening. Dr. Ivy and associates hope shortly to overcome this feature by further purification of the hormone, after which it will be ready for use in treating ulcer patients. The hormone treatment, by checking the acid in the stomach, will give the ulcer a chance to heal.

PATIENTS with malignant high blood pressure which could not be lowered by any other means, were helped by two new kidney extracts described by Drs. Irvine H. Page and O. M. Helmer, Lilly Laboratory for Clinical Research, Indianapolis, and Drs. J. R. Williams, Jr., T. R. Harrison and Arthur Grollman, Vanderbilt and the Johns Hopkins Universities. Not only was blood pressure reduced but the condition of the thickened arteries improved and the sometimes blinding eye disturbance accompanying very high blood pressure was cleared up.

A NEW chemical agent successful in protecting mice against streptococcus viridans, a germ unconquered by the sulfanilamide remedies, was announced by Dr. O. M. Gruhzit, of Parke, Davis and Company, Detroit. The new chemical remedy is sodium paranitrobenzoate. Although not yet tried on human patients, it may find a place in the treatment of certain diseases caused by streptococcus viridans, such as ulcerative or malignant endocarditis, a form of heart disease. Sodium paranitrobenzoate is relatively non-toxic to animals. Its therapeutic (curative) effect in mice infected with streptococcus viridans is of the same magnitude as produced by sulfanilamide in the beta hemolytic streptococcus infections. The sodium paranitrobenzoate has little or no effect in the latter type of streptococcus nor in pneumococcus infections.

DR. THEODORE FRIEDEMANN, of the University of Chicago, stated that the problem of why certain diseases, such as pneumonia and influenza, are more prevalent at one season of the year than another may be unraveled from the clues in his studies of chemical processes within the body of the pneumonia germ. In July and August lactic acid production by these germs rose to a peak of 95 per cent. falling to a low of 45 per cent. in January and February. Such a marked seasonal change in chemical activity is probably accompanied by "deep-seated changes in other functions" or activities. A study of such changes, especially as related to the many seasonal changes observed in animals, may throw light upon the perplexing problem of the seasonal occurrence of certain infectious diseases.

ARTIFICIAL sunlight can swiftly clear the air of tuberculosis germs floating about in it. Ultra-violet rays, within three seconds, killed 96 per cent. of the tuberculosis germs suspended in the air in experiments reported by Drs. William F. Wells and Max B. Lurie, of the University of Pennsylvania. Child and adult patients in hospitals and children in infants' homes and schools are being protected against germ diseases as a result of Dr. Wells's previous discovery of ways of applying the germ-killing power of ultra-violet light to such practical situations. With another of his inventions, a giant air centrifuge, he and Dr. Lurie measured quantitatively the number of tuberculosis germs in the air which when breathed by rabbits gave the animals the disease. Rabbits which inhaled 1,000 or more of the germs died of tuberculosis within five to six weeks, regardless of whether they were naturally highly resistant or highly susceptible to the disease. With smaller numbers of tuberculosis germs in the air, the rabbits got sick according to their natural resistance. When naturally susceptible rabbits breathed as few as 100 units of tubercle bacilli, they died of a type of tuberculosis similar to the childhood type of the disease. The naturally resistant rabbits, however, when exposed to the same number of germs developed a slowly progressing lung tuberculosis resembling the reinfection type of pulmonary tuberculosis in grown men and women.

FARM children in Florida, and other regions as well, are in danger of severe nutritional anemia if they live on home-grown food from poor soil that is deficient in iron. Such anemia is not primarily due to hookworm disease, as previously believed, according to Dr. Ouida Davis Abbott, of the Florida Agricultural Experiment Station at Gainesville, Fla. Hookworm infection affects the degree of anemia, but the prevalence of anemia among rural children in Florida is due primarily to diets low in iron. Anemia of children is so wide-spread that it has been called "the ubiquitous nutritional disease." From Nova Scotia, Massachusetts, North and South Carolina and Georgia as well as Florida have come reports of deficient soils and mineral deficiency diseases of cattle. Plants grown on such soils are lacking in iron and other blood-forming minerals. Both vegetables and meat from such regions, therefore, would be so low in iron that even children living on good diets would be anemic if the diets were composed of home-grown foods. Anemia was discovered in from 52 per cent. to 96 per cent. of rural children in Florida living in regions where the soil was predominantly deficient as shown by prevalence of salt sick of cattle. This age-old disease of cattle is known to occur when the animals are restricted to forages grown on certain white and gray sands and residual mucks known to be lacking in iron, copper, cobalt and perhaps other elements. Even though hookworm was wide-spread among the children in Dr. Abbott's study, many children with no hookworm were so anemic they had only from about a fifth to a half the normal amount of red coloring matter in their blood. When iron was given to children with hookworm, most of the symptoms, such as pallor, marked weakness, excessive fatigue, loss of appetite and edema, gradually disappeared, even when the hookworm infection remained. On the other hand, clearing up the hookworm infection did not improve the quality of the blood.

ATTACK on the arthritis problem by experiments with mice and a new, unusual type of germ which gives the mice symptoms typical of human arthritis has progressed to the development of a vaccine that protects the mice against this experimental arthritis. Results of the vaccination experiments were reported by Drs. Albert B. Sabin, now of the University of Cincinnati College of Medicine and formerly of the Rockefeller Institute, and Dr. Isabel M. Morgan, of the Rockefeller Institute. "I can see no present or future application of these experiments to human arthritis," Dr. Sabin replied to a question on this point. Because the germ, a pleuropneumonia organism, belongs neither to the bacteria group nor the virus group of disease-causing microorganisms, Dr. Sabin's studies of it are interesting to those who want to know all about the strange new germ which, even if it may never affect human beings, causes diseases in the laboratory mice used for many studies of human disease.

THE occasional sudden death of a good swimmer upon plunging into cold water apparently is due to the effect of the cold water on the body's production of a chemical substance whose action resembles that of histamine. Tests made on five healthy swimmers by Dr. Grace M. Roth, section on clinical physiology of the Mayo Clinic, and Milton A. Gabrielson, special research fellow, furnished this explanation of such deaths. Swimming in cold water between 65 and 85 degrees Fahrenheit increases stomach acidity. This finding, however, fits in with previous Mayo Clinic discoveries about persons who are allergic or hypersensitive to cold. The latest findings, made on normal persons, indicate the dangers even when there is no allergy or hypersensitiveness to cold, and explains the mechanism of the sudden deaths, linking it with the chemical, histamine. When an enzyme that inactivates histamine is taken into the digestive system half an hour before immersion in cold water, the increase in stomach acidity is prevented. This shows that the sudden increase of histamine-like substances due to immersion in cold water is what causes the trouble. Histamine dilates the small blood vessels and lowers the blood pressure dangerously.

JAMES STOKLEY