SCIENCE NEWS

THE EFFECT OF INSULIN ON BODILY PROCESSES

Science Service

INSULIN provides a key that may serve to open the doors to hidden mysteries of metabolism, Dr. J. J. R. Macleod, of the University of Toronto, one of the winners of the Nobel prize for medicine, told the American Association for the Advancement of Science on December 29 during a symposium on the ductless glands.

In addition to proving successful as a remedy for diabetes, this powerful drug is being used by the physiologist as a new instrument for learning the mechanism of the normal, healthy human body.

A large amount of work has been done on the action of insulin on normal animals, and the immediate effect of its injection is to lower the blood-sugar. This occurs so rapidly as to give the impression that the hypoglycaemia must be due to changes occurring in the blood itself. Investigation has shown, however, that the decrease is due to a rapid disappearance of sugar from the tissues, leading to a secondary removal of sugar from the blood. The cause for the creation of this "vacuum for sugar in the tissues" is obscure; no glycogen is formed in the normal animal following treatment with insulin, contrasting with the effect on the diabetic, and examination of the respiratory quotient does not reveal a marked increase in the combustion of carbohydrates. Instead of glycogen being formed it actually becomes greatly diminished, the reason being, no doubt, that it is being called upon to produce glucose to take the place of that which has disappeared. It looks, at present, as if the sugar disappears by being changed into some substance hitherto undetected by chemical means, and it is at least of interest in this connection that following the injection of insulin the free phosphoric acid of the blood decreases parallel with the decrease of sugar.

Dr. Macleod stated that glands from fishes have been found to contain large amounts of insulin and that in maritime countries they may prove useful as raw material for insulin manufacture. In this country with its large abattoirs, the more profitable source of insulin is the pancreas of cattle and pigs.

COLOR PHOTOGRAPHS OF MICROSCOPIC PLANTS

Science Service

COLOR photographs of microscopic plants, taken by the light emitted by the plants themselves after stimulation by a strong beam of light, were shown before the American Association for the Advancement of Science on December 29 by Professor Francis E. Lloyd, of McGill University. The photographs were the first taken by this method which is expected to be of great value in studies of the purpose of pigments in living organisms.

"Plants contain," said Professor Lloyd, "a considerable number of pigments which have the property of fluorescence, a property due to the ability of the pigment to change the wave length of the blue-white part of the spectrum into the longer wave lengths, green, orange and red. In the case of green pigments, the result of this property is to produce red light even though no red light is supplied.

"The attempt has often been made by various workers to see fluorescence in living microscopic plants by means of the microscope, making use of a special optical arrangement known as the dark field illuminator. The lack of success following these attempts led to the conclusion this was not possible. Indeed, the only way in which fluorescence has been seen microscopically in the living organism is by means of a very special optical arrangement known as the fluorescence microscope, or one in which only ultra-violet light is permitted as an illuminant. Since the visibility is low, no structures can be seen, nor can high magnification be successfully used."

Professor Lloyd then described a method of his invention whereby the dark-field illuminator can be so adjusted as to project a strong beam of light upon microscopic organisms in such a way as to bring out a brilliant fluorescence and also reveal their structure. When viewed by this method microscopic plants were seen to glow in brilliant hues of red, orange or yellow. Preparations of living plants were exhibited in which this was visible to the audience. Color photographs were also shown.

The importance of this discovery lies in the fact that it affords a new method of studying in plants the pigments which are connected with the process of photosynthesis, or the building up of tissue from the carbon, hydrogen and oxygen of air and water through the action of light. Evidence is increasing that other pigments beside the green chlorophyll are of importance in this way. Already structural relations have been demonstrated which were previously not understood.

SUN-SPOTS

Science Service

NEW sun-spots now appearing on the sun's disc are opposite in magnetic polarity to those that were seen during the last cycle. This discovery, by Dr. George E. Hale, of the Mount Wilson Observatory of the Carnegie Institution, is the result of over a decade of astronomical observations.

The new observations are declared to be revolutionary and the findings to be unexplained.

The spots, known to be centers of magnetic fields, travel across the disc of the sun two by two, each of a pair being of different magnetic sign. Before the time of minimum sun-spottedness which occurred only a few months ago, the pairs had exactly the opposite arrangement of polarity from that exhibited by the new spots now appearing on the sun.

This is taken to mean that the true cycle of sun-spots is just double the 11⅛ years now assumed and that the spots pass through two minima and maxima before a similar condition is repeated.

Just what effect this has on matters here on earth is yet to be determined although sun-spots are known to affect both the magnetism of the earth and the solar constant of radiation.

It is believed that the peculiar rotation of the sun which is faster at the equator than at the pole is related to sun-spot phenomenon.

CHANGE OF SEX IN PIGEONS

Science Service

COMPLETE transformation of an adult female pigeon into a fully developed male bird, indicating that man's inherited bodily and mental characteristics may be considered as subject to change and control, was reported by Dr. Oscar Riddle, of the research staff of the Carnegie Institution, to members of the American Society of Zoologists meeting in Cincinnati on December 28. Dr. Riddle believes that the scientific importance of this reversal of sex can scarcely be exaggerated.

The bird was a female blond ring dove, and at the beginning it was a normal female like thousands of other doves and pigeons which have been studied at the Institution's Station for Experimental Evolution at Cold Spring Harbor, Long Island, during the past 13 years. She laid eleven eggs between January 27 and April 15, 1914. These eggs were carefully examined and details concerning them recorded. A few months later, the bird began to act like a male. Still later, the former female took on weight and developed the crow of the cock pigeon.

After the last eggs were laid, the evidence indicates that tuberculosis began to destroy the female gland of this bird. The bodily condition which results from tuberculosis is known to approach the condition which our earlier studies have shown to be typical or necessary for the development of the male sex, and adverse to the development of the female sex.

Forty-four months after this bird laid her first egg she died. The autopsy showed advanced tuberculous infection of the spleen, liver and other organs. No female glands were found, but two well-formed male glands in their normal position were present.

Dr. Riddle presented complete records for the period of egg-laying and for all later periods to the time of death. Figures and curves showing the progressive change in the body weight of this bird during this same period were also presented and described.

Dr. Riddle claims that "The result clearly indicates that the hereditary basis of no bodily or mental characteristics may be considered as irrevocably fixed and uncontrollable," and that as one of the characteristics known to be hereditary and normally to be controlled through the so-called "chromosomes" of the germ cell has been shown to be capable of a reversal to the alternate form, it becomes wholly probable that all hereditary characteristics of every human being and of every organism are capable of reversal and modification; and that the accomplishment of such modification and control is a matter which merely awaits the definitely directed efforts of investigators.

FISHING FOR MICROSCOPIC PLANTS

Science Service

FISHING for microscopic plants by suspending glass plates in the sea, it is stated, offers a new and important scientific method for investigating the habits of fish and other ocean animals. Professor Orville Turner Wilson, of the University of Cincinnati, described the system to the Botanical Society of America on December 28 and told how effective he had found it in his work at the Scripps Institution for Biological Research near La Jolla, California.

The ocean waters near shore are swarming with tiny plants and animals. Of the plants the diatoms are most numerous. Because of the beautiful markings of their glassy walls and because of their remarkable symmetry of form they have always been favorite subjects for study with the microscope. It has been the custom to collect them in bottles of sea-water and examine drops of the water to find them. In this way the individual plants could be examined but little information was gained as to their habits of living or their natural groupings.

By removing one of the glass plates from the water each day and studying it in the laboratory, it was possible to note the methods by which the diatoms attach themselves to hard surfaces; the natural groupings of these plants; the growth and form development of the individuals; the competition and survival illustrated in these miniature societies; and their relation to other plants and animals. In a very few days the plates were almost covered with living organisms. Many photographs were taken of these plates, some species new to science having their pictures taken for the first time.

Dr. Wilson asserts that this type of fishing for creatures that were not fish was as fascinating as it was unique. The method is a promising one for investigating the kinds of microscopic plants and animals in the water; their number at different seasons of the year, their development and their life-habits. These matters are of vital importance in investigating the habits of fish and other ocean animals which use the microscopic plants and animals for food.

THE PROJECTED FLIGHT OF THE SHENANDOAH

Science Service

THE *Shenandoah* in her projected flight over the unexplored Arctic Ocean north of Alaska may make discoveries which will have great value in forecasting North American weather, according to Major E. H. Bowie, supervising forecaster of the U. S. Weather Bureau. If land is discovered in that vast region, and especially if it be of large area, it might possibly serve as a location for an outpost of the Weather Bureau to stand guard over this breeding place of cold waves.

For the entire polar cap is, said Major Bowie, a vast

reservoir into which flows, settles and becomes unduly cold the air of the northward flowing currents from southern latitudes, and especially is this true during the long winter night of the polar region, a night which north of the Arctic Circle begins in September and ends in March. These northward flowing aerial rivers chilled on their way north, by contact with ice and snow-covered surfaces, and by rapid loss of heat by radiation, pass on to the polar basin, settle to the earth's surface and build up, it is believed, a great semi-permanent area of high barometric pressure. This results from the increasing weight of the cold air, and to this the incoming air flowing in aloft from regions farther south, is added.

At intervals and especially in winter, this reservoir of cold outflows and spills southward into the temperate zone, the force of its flow being sometimes enough to carry relatively cool air all the way to the tropics. If it could be known when this was about to occur it would be possible to make forecasts of cold waves or of colder weather for a week or more in advance, while, on the contrary, if the polar reservoir of air were known to be depleted, a northward flow of warm air over the temperate zone might reasonably be expected, bringing a hot wave in summer and mild weather in winter.

The Weather Bureau now has a number of stations in Alaska, but the northernmost of these are in the Yukon valley. If one might be established at Pt. Barrow on the northern coast and another several hundred miles north on the land supposed to exist there, these changes in the quantity of air in the polar reservoir might be more readily seen and their effects predicted. So the bureau is keenly interested in what the *Shenandoah* may find.

THE METRIC SYSTEM

Science Service

DR. HARVEY W. WILEY, in an address to the Metric Association at Cincinnati, urged that efforts be made to secure a law requiring all government business to be transacted in the metric system. This, he said, would pave the way for the speedy education of our people and lead almost automatically to the gradual extension of the metric system into all forms of business. He believes that the metric system of weights and measures would greatly simplify teaching in schools and promote honesty in trade.

Pointing out the tendency to fraud fostered by the present use of many weights and measures, he said:

"A short time ago a grocer in the city of Washington was arrested for selling short-weighted articles. In his defense he said that he had always understood that twelve ounces made a pound. It is possible his father was a druggist, and he had thus inherited a propensity which proved extremely profitable in his business. I doubt if any court would have been able to convict this party of fraud, unless the particular law applying to such cases should have defined the pound as 'avoirdupois.' Even the term 'avoirdupois' might have been subjected to legal possibilities. It means, 'to have some weight,' and a troy pound also has weight.

"Any system of weights and measures which is variable, indefinite, unscientific, unrelated, and which is differently defined in laws of the different states and municipalities gives an opulent opportunity for deception and fraud.

"If there are two or three kinds of tons—and there are three kinds—unless some agreement is made, the buyer will want to get the biggest ton and the seller will want to sell the smallest ton. There are more different gallons than there are different tons, and when it comes to barrels the variation is even greater."

In Washington, where the law requires a long ton of coal, coke is always sold by the short ton. The buyer naturally thinks he gets a long ton of coke. But coke is not mentioned in the act.

ITEMS

Science Service

THE active principle of bee stings in their curative effect upon rheumatism is being sought for by German scientists who are trying to produce a remedy for the disease which will be as effectual as the stings and which may be administered with less discomfort and inconvenience. It seems to have been demonstrated that while 100 or more bee stings cause very disagreeable constitutional symptoms such as dizziness, fever and nausea in non-rheumatic subjects, the same treatment applied to rheumatic subjects causes less discomfort at the start and later, in many cases, a cure of the disease. The healing factor is supposed to be a protein which acts like the milk injections which are largely used at present as a remedy. If the protein can be isolated the sufferers from rheumatism have hopes of a cure without being stung.

MOTION pictures as a help to health were advocated at a session of the Health Education Section of the association. James A. Tobey, administrative secretary of the National Health Council, said movies can aid in health promotion by their demonstrations of correct methods of personal hygiene. He urged a wider use of health movies similar to those now used in Massachusetts, where the hygiene division of the State Department of Health employs films for that purpose.

THE size of icebergs is generally overestimated, Professor Robert DeC. Ward, of Harvard University, told members of the American Meteorological Society meeting at Cincinnati. Professor Ward spent two weeks last June on one of the U. S. Coast Guard cutters engaged on ice patrol duty off the Grand Banks. The tallest berg measured by the ice patrol during the past four years was stated to have been 248 feet high at its highest point; while the longest was 1,690 feet from end to end. The blowing up of icebergs by gun-cotton wrecking mines was only practicable when the berg was old and partly disintegrated. Dr. Ward saw one in this condition blown up and he estimated that its life as a danger to shipping was shortened by at least two days. Illustrating the magnitude of the task and the impossibility of completely destroying the larger bergs, he told of seeing one which was estimated to contain 36,000,000 tons of ice.