SCIENCE NEWS

FORECASTING ICEBERG CONDITIONS

Science Service

ICE observation posts located on the bleak coasts of the far north would probably enable government experts to forecast iceberg conditions in the trans-Atlantic shipping lanes months in advance, Edward H. Smith, of the U. S. Coast Guard, said in discussing the work of the international ice patrol service since its inauguration ten years ago as a result of the *Titanic* disaster.

"The situation may be likened to that of a river," he explained. "Flotsam observed up stream in the current will later appear at the river's mouth. In this case the Labrador Current is the river whose mouth is in the vicinity of the Great Newfoundland Bank. The flotsam is the icebergs. It takes approximately five months for a berg passing Cape Dyer, Baffin Land, to appear south of the forty-fifth parallel. If a station could be located at Cape Dyer, or some other point along the Arctic drift where it sweeps in close to the shore, to report the number and dates of icebergs passing, it would prepare us to meet and deal with a situation about which to-day we lack advance information."

Some years produce large quantities of ice; other years brings scarcely any. In some years the ice is held up in high latitudes, in others it drifts far south. The ice observation posts might also serve as year-round weather stations, as the weather is one of the chief factors which determines the flow of the ocean currents and the melting of the ice. But great difficulty has been experienced in getting meteorological records from critical points on the Greenland and North American coasts on account of the lack of suitable weather observatories.

Describing the work of the ice patrol which was organized and placed under United States management by international agreement in 1913, Mr. Smith stated that "a continuous patrol is maintained by two United States Coast Guard cutters capable of keeping the sea in all kinds of weather. Each one alternately takes a two weeks' tour of duty and is then relieved by the other. When one of these ice scouts approaches the ice region, it collects all information from near-by vessels and proceeds to search the area south of latitude 43 for signs of ice, and broadcasts information as to the limits of the ice to all approaching vessels. In connection with this scouting duty, the Ice Patrol secures scientific observations relating to the ice area and forwards daily reports to the Weather Bureau.

One of the things brought out by the evidence gathered by these vessels is that there is no truth in the old idea that the cold Labrador current flowing south dives under the warmer Gulf Stream moving northeast and comes up again to the southward. When these two ocean currents meet the Labrador Current is arrested, then turned toward the Gulf Stream and finally pulled along in an easterly flow parallel to it.

A COMET'S TAIL

Science Service

A COMET'S tail one million miles in length pointed toward the sun instead of in the customary opposite direction is a remarkable phenomenon revealed by observations made at the Yerkes Observatory of a comet now far outside the earth's orbit. This is a peculiar and uncommon circumstance for which science at the present time can offer no very satisfactory explanation.

The object that exhibits this peculiar tail is called Baade's Comet, because of its discovery by Dr. Walter Baade, of the Bergedorf Observatory near Hamburg, Germany, in October, 1922. It is one of three faint comets visible telescopically in the sky at the present time, and in addition to its extraordinary tail it is of interest in that this is its first visit to the neighborhood of the sun, while both of the other comets now visible have been former visitors.

A comet usually is composed of a head containing a more or less eccentrically situated nucleus, and a tail pointing away from the sun. The tail increases in size and brilliancy as the comet approaches the sun, and diminishes or even disappears again as the comet recedes from the sun.

The tails of comets vary greatly in size and shape, but generally do not differ in direction. From the fuzzy oval head of the comet there is often, to be sure, a short fan-like formation spread toward the sun, but the main appendage is almost without exception on the opposite side. Only in rare instances do we find, as in Baade's Comet, a long tail directed toward the sun.

Baade's Comet when discovered was a faint hazy object without any tail whatever. It never got within two hundred million miles of the sun. It was photographed at the Yerkes and Harvard College Observatories and elsewhere, and carefully studied at many places in Europe and America until its orbit was determined. As the comet approached the sun it began to form tails, a short broad one in the usual position and an enormously

long narrow one pointing within twenty degrees of the direction of the sun.

Although this type of tail is difficult to explain, there is even for the usual kind of a comet's tail no entirely satisfactory theory. Comets' tails are believed to be composed of tiny dust particles which are driven in a glowing condition out of and away from the nebulous head by some force that issues from the sun. Whether this phenomenon is caused by light pressure, or electrical action, or some as yet undescribed force, astronomers can not demonstrate. Since the spectroscope was invented, the tails of sufficiently bright comets have been analyzed with that instrument, and much has been learned of their composition. But the cause of their existence remains a matter for intelligent speculation. The astronomers realize that any theory that purposes to explain comets' tails must also take into account this abnormal appendage of Baade's Comet.

DEATH RATES IN 1922

Science Service

THE death rate for the year 1922 was 8.8 per 1,000 lives and was the lowest, save one, ever recorded, according to statistics just compiled by the Metropolitan Life Insurance Company and announced through Science Service by Dr. Louis I. Dublin, statistician. This record is based on the mortality report of millions of industrial policyholders of that company which constitute over one eighth of the population of the United States and Canada. The facts revealed in this report are considered to afford the earliest reliable index of general health conditions in the two countries during the year just closed.

For the last six months of the year 1922, the record was the best ever shown for any half year in history covered by policyholder statistics. But considering the whole year, the record for the previous year, 1921, shows a death rate slightly lower, not quite one per cent. less. Had it not been for the outbreak of epidemic influenza in the early months of 1922, the year's health record would have been better than the minimum established in 1921.

The 1922 death rate for tuberculosis, 113.4 per 100,000, was the lowest ever recorded. Since 1911 the tuberculosis death rate has been reduced nearly one half. The mortality from this disease has been falling at a very rapid rate among the wage-earning group of the population and is continuing to decline year by year.

The year 1922 recorded the lowest typhoid fever death rate in the history of the insured. The figure was 5.6 per 100,000, a reduction of one sixth from the rate from 1921 and of nearly three fourths from the figure recorded in 1911. Pronounced improvement was shown in three of the four common communicable diseases of children, namely, diphtheria, scarlet fever and whooping cough. The measles death rate rose slightly. The year's record shows a reduced death rate for diseases related to child-bearing. The figures show that there is, nevertheless, much to accomplish in this very important field of health work. In the field of violent deaths declines were recorded for suicides, homicides, accidental burns and accidental drownings.

Increases were recorded in 1922 over the record of 1921 for influenza, pneumonia, organic heart diseases, diabetes, Bright's disease, cerebral hemorrhage and alcoholism. Among the violent deaths there were increases in the rates for accidental falls, machinery accidents, railroad accidents and especially automobile accidents. For the last named, the death rate increased in 1922 ten and seven tenths per cent., the 1922 death rate was nearly six times the rate for 1911; forty-eight per cent. of the deaths in automobile accidents were those of children under fifteen years of age. "The further rise in the automobile accident death rate is a challenge to the instinct of self-preservation of the American and Canadian populations," said Mr. Dublin.

The increases in 1922 for chronic nephritis and cerebral hemorrhage were slight. The diabetes rate increased 10 per cent. in 1922, and the figure for that year, 17.0 per 100,000, is the highest on record. The alcoholism death rate rose from 0.9 per 100,000 to 2.0, which is equivalent to a rise of 122 per cent. This is the highest alcoholism death rate since 1917, but is still much lower than the rates recorded for all years prior to 1918. Deaths from wood alcohol poisoning are not included in these figures.

CHEMICAL WARFARE AGAINST SHIPWORMS

Science Service

THE Chemical Warfare Service of the War Department has entered the fight to save our wharves and harbors from the attack of submarine enemies. Shipworms and gribble which annually do enormous damage by honeycombing piling and dock timbers are the foes against which knowledge of poisons gained in war will be directed.

Experiments will be made to find the best substance for impregnating timber which will be poisonous to shipworms after they have entered the wood and to find a substance which will prevent them from entering. It is proposed to stop the shipworm as it floats about in the water in the first stage of its growth from settling on the

timber by altering the surface of the wood, so that they will not be attracted to it. They seem to be especially fond of fresh timber.

Means may also be found for poisoning the water in the vicinity of wharves so as to kill off the larvæ during the breeding season without seriously injuring any near-by fishing or oyster interests.

President Harding has designated C. H. Huston, assistant secretary of the Department of Commerce, as the governmental representative on the committee of marine piling investigations of the National Research Council, to assist in arranging for the cooperation of the Bureau of Yards and Docks of the Navy Department, the Engineer Corps and the Quartermaster Corps of the War Department, and the Department of Commerce with the Chemical Warfare Service in carrying on these marine borer investigations.

Shipworms when young start boring a hole in timber by means of the chisel-like edges of their shells. They continue to tunnel as they grow, passing the sawdust through their bodies to the outside. By impregnating the wood with creosote or other poison the shipworm career at tunneling is cut short in the treated timber since the wood is eaten. If the timber is untreated, a number of these mollusks, making it their home, may honeycomb and weaken it. As a result large timbers are often completely cut in two near the water line.

Gribble are small crustacea about the size of white ants and work with similar results.

THE HENRY DRAPER CATALOGUE

WORK has been begun at the Harvard College Observatory on the extension of the Henry Draper Catalogue, a compilation of the spectra of 225,000 stars, made over a period of many years as a part of the observatory's fundamental task of surveying and mapping the heavens.

Since the work of compiling the catalogue was undertaken, improved methods of stellar photography have made it possible to secure the spectra of fainter stars, and the new plan is to go for a second time over certain portions of the sky, adding the spectra of other stars than those already included. The work is beginning with a part of the northern Milky Way.

The extent to which this new survey supplements the original one is illustrated by the example of a single photographic plate recently described at a meeting of the American Astronomical Association. The plate covers a small part of the Milky Way where the stars are especially numerous, and it shows the spectra of 140 stars, only 14 of which had been included in the Henry Draper Catalogue.

As the spectrum of a star shows of what materials it is composed, such a catalogue is of fundamental importance to astronomers. The Draper Catalogue, containing as it does vast numbers of these spectra, is constantly used for reference in observatories. It consists of nine volumes. Of these, seven have been published to date, and meanwhile the observatory furnishes yearly to the astronomers of all countries upon request hundreds of spectra contained in the unpublished volumes.

The extensions to the catalogue will appear at intervals in periodical form. This new work will be in the hands of Miss Annie J. Cannon, of the Harvard Observatory staff, who has had charge of the classifications of stars from the Henry Draper Catalogue from the outset.

PRESENT STATUS OF "INSULIN"

The Journal of the British Medical Association

ABOUT one year ago it was announced that Banting and Best, working in the University of Toronto, had succeeded in isolating from the pancreas a substance capable of causing a marked reduction in the percentage of blood sugar and in the excretion of sugar in the urine of diabetic dogs. Since that time marked progress has been made in the clinical study of the preparation, but, unfortunately, uncontrolled newspaper announcements have given misleadingly exaggerated ideas of its possibilities. It is, therefore, well to have from Dr. J. J. R. Macleod, in whose department the work was conducted, an official statement concerning the present status of the use of this substance.

The original preparation prepared by Banting and Best was a saline extract of the residue of the pancreatic tissue remaining some weeks after the ducts had been ligated. It was shown that this active principle is soluble in alcohol, and J. B. Collip succeeded in preparing an extract that is practically protein-free and nonirritant on subcutaneous injection. Although it was possible to prepare the product on a small scale, early attempts to prepare it in quantities met with difficulties. Furthermore, investigations on animals showed that the product when taken in an overdose produces alarming toxic symptoms. This made it desirable in the interest of public safety to withhold general publication of the method of preparation and general distribution of the product until some satisfactory method could be found for preparing it in marketable quantities. The broadcast issuing of products of varying potency would result in contradictory and unsatisfactory results which would delay, if not prevent, an adequate understanding of the value of the

substance, and might result in serious consequences.

The investigators have, therefore, applied for patents for their product in Canada, the United States and Great Britain, and have formally tendered the patents, when granted, to the University of Toronto. The university has accepted the trust on the understanding that the patents shall be employed for the sole purpose of safeguarding the production of the substance against commercial exploitation, and to insure the marketing of a standardized product. Dr. Macleod states that "the method by which the university intends to fulfil these conditions is to license approved manufacturers to produce "Insulin" under the patents subject to their satisfying the university by frequent submission of samples of their product that it is of adequate potency and purity." A royalty will be charged the licensees in order to maintain a testing laboratory, and any surplus income will be used for research. The original investigators receive no monetary return from the sales. In the meantime, several large commercial chemical houses are investigating the problem of producing the substance in large quantities, and a number of physicians conducting clinics in large hospitals are testing the products produced, under controlled conditions. Dr. Macleod states that this collaboration will be continued until there is every reason to believe that a product of standard potency and nontoxicity can be manufactured with certainty. From the present indications it is hoped that the experimental period will be ended some time during the first half of 1923.

As to the clinical use of the product, it is the belief of Dr. Macleod that it will probably never entirely replace careful dietary regulation, but that it is of undoubted value in assisting the weakened power to metabolize carbohydrate. The preparation, as made at present, must be given subcutaneously, usually in 2 or 3 c.c. doses twice daily; it is hoped that other methods of administration may soon be discovered.

These investigators and the university with which they are affiliated are to be congratulated on the methods they have adopted for controlling the production and the marketing of a product which holds large therapeutic promise. Such an investigation as they have outlined and are undertaking should be sufficient to show not only its value in the treatment of this hitherto very difficultly controlled disease, but also its limitations. It is to be hoped that when the investigations are finally completed the directors will also insist on controlling the advertising claims and methods of marketing, the fields in which the greatest abuses have crept in heretofore in connection with other proprietary substances. The conservative and scientific methods that have so far characterized the development of this new agent warrant the belief that the therapeutic claims will be so controlled

ITEMS

Science Service

MARINE animals are made partly of metal. Examination by Miss H. W. Severy, of Stanford University, of sixteen denizens of the sea from shrimps to whales has demonstrated that all contain zinc and most of them copper. For several years it has been known that copper is present in oysters and sometimes it occurs to such an extent that it colors them green and may even give them a metallic taste. Miss Severy showed that copper was also present in sea anemones, sea urchins, shrimps, crabs, salmon and sea-lions, but was absent in clams and whales. The average amount of copper found in these animals was about five parts in ten million while the zinc content amounted to four parts in one million. Certain animals such as the snake have long been known to have some copper in their blood which gave it the blue color. It acts in the same way the iron acts in the blood of higher animals: it is a carrier of oxygen to the tissues. The part zinc plays in the animal body has not been ascertained, although it is assumed that it functions as an aid to the digestive fluids. Zinc apparently is more widely distributed than copper, for the investigator found it in two higher animals belonging to the group of mammals, namely, the sea-lion and the whale; the latter showed no trace of copper in its body.

How strong is wood? because of disagreements and miscalculations as to the strength of lumber, which have resulted in accidents, the U. S. Forest Service, the American Society for Testing Materials and sixteen other organizations have appointed representatives to settle the question and work out standard tests for timbers. Detailed specifications for testing steel, cement and other products have been worked out, but the exact methods of learning the strength of wood have never been laid down.

THE Finnish state aeroplane factory recently completed its first machine built entirely, except the motor, from materials produced in Finland.

THERE are now 22 foreign and 15 domestic quarantines in force in this country aimed at controlling insect pests already present and guarding against the entry of others from abroad.

ONE THIRD of the nearly 6,000 forest fires started in the national forests of this country last year are directly attributable to the carelessness of campers.