SCIENCE NEWS

RADIO AND WEATHER PREDICTIONS

Science Service

ESTABLISHMENT of the three radio weather stations in the Mackenzie Valley, which are to be set up by the Canadian government during the coming summer, will mark a long step toward the world-wide information necessary to make probable long range forecasts, Major Edward H. Bowie, meteorologist of the U. S. Weather Bureau, declared here to-day. In cooperation with our Alaskan stations and those of southern Canada, these radio outposts will forward observations taken over the most important region of Arctic night from which our outbursts of intense cold come.

The Mackenzie River Basin is one of the three great cold centers of the northern hemisphere. Siberia and Greenland are the other two. These large land areas are colder than the polar seas, because land tends to lose its heat by radiation more readily than water does.

Emphasizing the importance of observations from such regions for both hot and cold weather prediction, he said that soundings made in recent years by means of balloons and kites indicate that the fundamental cause of our storms is to be found in the general movements of our upper air. Rivers of cold wind from the north sweep toward the tropics and the currents warmed by the tropical sun flow north in a constant attempt to create an atmospheric equilibrium.

Owing to the rotation of the earth, winds are deflected to the east and the cold winds from the Mackenzie Valley sweep southeast over our country, while Europe, in the words of the old hymn, literally gets its weather from "Greenland's icy mountains."

Not until 1900, however, did Europe have any meteorological observatories beyond her coasts from which warnings could be sent. Since then stations have been set up by international agreement on the island of Jan Mayen, in Iceland, in Greenland, and arrangements are now being made to establish another station on Baffin Land.

To illustrate the interchange of air between north and south, Major Bowie explained that a mild winter in North America may mean that, owing to differences in the tropics of the eastern and western hemisphere, the cold upper air currents from the region of Arctic night have taken an Asiatic course toward the tropics rather than southeast through the United States.

Sometimes cold winds from Siberia sweep across Bering Strait and take a southeastern route through America, he stated in pointing out the importance of observations obtained from the Russians before the war.

Meteorologists, however, have been too accustomed to consider the northern half of the world as a separate climatic system little influenced by what is going on in the southern half. There is a seasonal leakage between the two hemispheres, and a knowledge of conditions in South America, Africa and other southern lands is necessary to the most effective weather forecasting.

Lack of information from all sections of the earth is the reason that predictions far in advance can not be made. With reports from observatories in all sections of the globe, it is probable that accurate long range forecasts could be made.

A STELLAR CAREER

Science Service

THE brilliant new star, Nova Aquilæ No. 3, which for a few days in 1918 was the brightest star in the sky, with the exception of Sirius, and which in actual light-giving power was one of the greatest objects ever recorded, has now, after an eventful career, settled down to its normal and original faintness, according to a report being published from the Harvard College Observatory. Nova Aquilæ No. 3 was the brightest new star seen for more than three centuries.

The chapters just written at Harvard in the history of this nova call to mind the exciting beginnings of its story, which were followed promptly by a gradual decline, both in activity and in scientific interest. From now on the nova, that was formerly the concern of a hundred observers, will receive only a moderate amount of routine attention. It has had its day.

On June 5, 1918, and for at least thirty years before that, Nova Aquilæ No. 3 was an ordinary faint star of the tenth or eleventh magnitude, visible only with the aid of telescopes. Four days later it rivaled Sirius in brightness, being, in astronomical language, of magnitude —1.2, and 40,000 times brighter than it was the week before. This sudden leap into visibility and consequent fame was accompanied by remarkable changes in the color and character of the light, showing that the matter composing the star was disrupted, enormously excited, and thrown out of equilibrium by the cataclysmic rise in temperature. Whether the catastrophe was brought about by a collision of the star with another star or with a nebula, or whether it represents an internal explosion, astronomers are not yet prepared to say.

The new star was discovered by scores of observers in all parts of the world. Probably the first to observe it was G. N. Bower, at Madras, India. He saw the nova on June 8 when the time at Greenwich was 4 P.M., corresponding to 11 o'clock in the morning at New York. His priority is due, no doubt, to the fact that the darkness of night comes earliest at points far to the east of the Greenwich meridian. Later in the same day, and long before Bower's observation became known, many Europeans and Americans discovered for themselves the brilliant new star in the eastern sky.

A nova as bright as the first magnitude is of such rare occurrence that astronomers all over the world began investigations immediately, with all the means at their disposal. In fact, no new star has been so well observed as Nova Aquilæ No. 3. During the first months, when it was visible to the unaided eye, it was followed by amateur and professional astronomers everywhere; afterwards only by those who had suitable instruments. The result was that in less than a year more than six thousand visual observations of the light variations had been accumulated at Harvard from two hundred and fifty different observers in countries scattered over the entire globe. More than a thousand photographs were made in Cambridge, Canada, Peru and China, and a discussion of this work is now in press.

Since the exciting part of its career, in 1918-1919, telescopes have kept a complete record of the star's activities. An account of its past variations in light, color and spectrum is recorded in the Harvard publications; and now it is announced that the star has returned to normal brightness. The peculiar spectrum of Nova Aquilæ, however, will probably continue for some time to show that here is a star with a past. Its career has been similar in almost all details to the careers of other novæ, the chief distinction in this case being the unusual brightness attained, not equaled since the nova observed by Kepler in 1604.

IMITATION WOOL FROM COTTON

Science Service

THE large French textile concern, Société Gillet et Fils, has developed a process for making an imitation wool from cotton. The process has also been patented in the United States.

Wool is an animal fiber, derived from the sheep, while cotton is a vegetable fiber, grown in the fields. These two fibers, so different in origin, also differ essentially in their structure and sensible properties, so that they can be rather easily told apart in the yarn. But when they are woven into fabrics and especially when a woolen cloth contains some cotton, it is a difficult matter to determine which is which. Thus, only those expert in textiles can tell definitely whether a fabric is all wool or not by the mere feel of the goods. The chemist can detect the presence of cotton in wool under the microscope. When the two fibers are examined individually, the burning test indicates wool by the characteristic odor of burning feathers.

The new process of making imitation wool from cotton effects a change in the fiber, so that cotton also burns with the odor of burning feathers. This peculiar odor is due to the presence of the element nitrogen in the form of protein matter in the wool. When the twisted cotton fiber, which has the property of absorbing and holding fast liquids even when subjected to vigorous washing, is treated with a solution of protein in the partially decomposed state, the cotton is converted into an "artificial wool."

The process is simple. A solution of glue or gelatine, egg albumen or casein is first partially broken down by acid and then the cotton fabric or yarn is impregnated with it. By varying the temperature, the time of immersion and the proportions and nature of acid or protein, the degree of conversion can be regulated within wide limits. After the cotton fiber has absorbed the protein, it is removed from the bath and washed with water. This has the effect of precipitating the protein on the fiber in an insoluble condition. As the solution has penetrated into the internal structure of the cotton, this results in the latter being completely filled with insoluble protein matter, which can not be removed under ordinary conditions.

The process is applicable to vegetable fibers other than cotton. Either the yarn or the finished cloth can be treated with equally good results. Mercerized cotton cloth can also be converted by this process, as the mercerization has no effect on the ability of the fiber to absorb the protein solution.

"Artificial wool" has characteristic properties of natural wool. It resembles the latter so closely that the burning test can no longer be used to tell whether the fiber is real wool or not. Increased strength, good wearing qualities, a certain amount of waterproofing are claimed for this new fiber.

SOUND SUPPRESSION

Science Service

A DEVICE to eliminate undesirable noises has been invented by Dr. G. W. Stewart, professor of physics in the University of Iowa. This invention makes use of an entirely new method of sound

suppression which will probably prove applicable to telephones, phonographs and musical instruments so that these machines will give us only those notes we want to hear.

Dr. Stewart does not obtain his results by putting obstructions in the path of the unwanted sound waves, but by causing successive waves to interfere with each other's transmission. Illustrating how this was done, he took a brass cylindrical tube one half inch in diameter and six inches long, containing nothing but air and open at both ends, and caused it to transmit all tones of a piano, up to a certain note, and above this to transmit no audible sound. With another similar tube, the tones below this same or any other note were refused transmission, but all higher tones passed freely. The tubes, while entirely open and free from obstruction, have, at regular intervals, branching tubes and chambers. At each branching point waves are reflected backward through the tube.

"The design of the branches can be made in such a manner as to produce a backward reflection and an interference of almost any group of tones," Dr. Stewart explained. "This new basic method of sound wave manipulation may find application in many acoustic devices in use to-day. In fact, there is opened to the imagination the possibility of the elimination of undesirable noises and the enjoyment of sounds adjusted to an individual's esthetic taste." Dr. Stewart calls his device an "acoustic wave filter."

THE EXTERMINATION OF FUR-BEARING MAMMALS

Science Service

H. E. ANTHONY, associate curator of mammals of the American Museum, estimates that the present rate of destruction of mammals throughout the world is probably not less than fifty million a year, of which thirty million represents the demands of the fur trade. Extermination of large animals has been going on for a century, but the extermination of the small mammals has been extremely rapid in the last two decades. Muskrat, squirrel, mole, raccoon, opossum, formerly slightly valued for fur, have been relentlessly pursued to satisfy the demands of fashion.

Europe, North America, Asia and Africa have eliminated their wild animals through similar causes. Food supply, fur supply, industry, art, agriculture and deforestation, and, in a minor degree, sport, all have helped. The number of game animals still surviving in the mountains of Asia is relatively great.

When cave men first began the destruction of mammals for food and clothing some 400,000 years ago they were probably less destructive with their primitive weapons than most of the large predatory animals. These early men first used light from burning animal oil and fat and this demand has culminated in the elimination of the sperm whale and other marine carnivora. Twelve thousand whales have been taken in a single season from the American Antarctic.

Agriculture on land, the legitimate clearing of the land and protecting farms and gardens has been another cause of elimination. The ranging of cattle and sheep over great areas, destroying winter food for game, the killing of game by herd tenders, the bounty system against carnivora and indiscriminate poisoning campaigns have all been factors. Agriculture, the meat supply and the fencing of land is eliminating the game of Africa. Legitimate destruction by sportsmen has been comparatively a small feature.

The fur trade is now threatening to bring to a close the age of mammals which began three million years ago. The use of furs for protection has long since passed. Now it is fashion that demands them.

WEATHER RECORD ON TREE TWIGS

Science Service

SPRING weather records for the past ten to fifteen years can be read from the tiny twigs of many trees, according to reports from the Missouri Botanical Garden. Statistical study of scars left by bud scales on the branchlets of silver and Norway maples have shown the surprisingly great effect of climatic conditions on the amount of annual growth and indicate that the weather most favorable to the tree's development over a long period of years may be determined by such an investigation.

Scars are left on the twigs where growth starts each spring. The annual growth in length between these scars has been measured by the Botanical Garden experts for the past four years. From four to seven healthy, unbroken twigs from a large number of trees were used. Although some were large and others small, they all showed the same properties of growth for the same year. Climate is the only factor which, it is claimed, could have influenced all these differently situated trees, and, as the silver maples make most of their growth during a short period in spring, the twigs furnish an index to the weather of that season during the last four years. The figures show that 1919 and 1920 were good growing seasons while 1921 and 1922 were much less favorable. The scars disappear as the branch enlarges, but it is not unusual to find complete records for the previous ten to fifteen years.

THE KIDNEY AS A FILTER

Science Service

THE kidney acts like an ordinary filter in removing waste products from the blood, Professor A. N. Richards and Dr. O. H. Plant, of the University of Pennsylvania, have discovered as a result of experiments which show that in the kidney there is a miniature microscopic filtration plant of extreme complexity.

The blood flows through the finely divided network of blood vessels in the kidneys to many thousands of microscopic filters. Since the blood passes over the heads of these filters under considerable pressure, some water and waste products pass through them, ultimately being excreted, while the bulk of the blood passes back to the main blood stream. Increase in the pressure of the blood on these filters increased the amount of waste products eliminated, just as increase of pressure on a water filter augments the flow of water through it.

In order to carry out such an investigation, it was necessary to develop microscopic instruments and a very fine technic. Although the filtration theory of kidney secretion has been held for years by physiologists, so difficult was the technic to prove it that not until the present time has it been satisfactorily verified.

INTERNATIONAL TELEPHONY

London Times

IN the address which he delivered as president of the Institution of Electrical Engineers Mr. Frank Gill gave some striking examples of the achievements of long-distance telephony. There is undoubted fascination, at least to the outside observer, in the idea of the secretary of state for India being able to speak from London to the viceroy at Delhi; yet, in fact, the direct distance is about the same as the length of a circuit in the United States, over which calls can be made regularly, and from what Mr. Gill said it appears that the construction of a line that would permit conversation between persons ten thousand miles apart is not technically beyond the present range of the telephone engineer. Mr. Gill's immediate purpose, however, was to urge the need, whether from the point of view of improving the relations between the nations, or for the ordinary purposes of commercial intercourse, of establishing efficient telephonic communication between the countries of Europe. Here the distances involved are comparatively moderate, and the difficulty is that the high-efficiency telephone circuit is an exceedingly delicate mechanism which is easily thrown out of balance and therefore requires a unity of design and operation that can not be expected from the forty self-contained telephone authorities of Europe. Mr. Gill suggests as a solution the formation of a company or commission, which, by arrangement with the governments, would take over the whole of the through business within and between the different countries. The establishment of such a body would obviously not be an easy matter, but probably it could be managed, provided that a sufficiently insistent demand for international telephony made itself clear. Difference of language is another obvious difficulty, but one which it is possible to exaggerate, though the telephone often seems to magnify peculiarities of speech so that, for example, a local accent, which is scarcely noticeable in face-to-face conversation, becomes well marked in the receiver.

ITEMS

Science Service

WHY loggerhead turtles readily find their way to the sea soon after hatching has been discovered by Professor George H. Parker of the zoological department of Harvard University. These reptiles are hatched inland and very soon after birth crawl out of their nests, he explained to-day. Then with a very few exceptions they immediately start their journey in the exact direction of the sea. Professor Parker studied this phenomenon at Miami Beach, Florida, and found at least three causes for the apparent ocean instinct of turtles. The most important reason for this behavior of the turtles is their tendency to go downhill, he believes. They also show an inclination to move toward regions in which the horizon is clear and unobstructed by large masses. And blue areas seem to attract them more than other colors. The path to the sea is usually slightly down hill and toward the blue sky in the open horizon. If suitable obstructions were placed in their paths, these turtles would crawl away from the sea just as regularly as they usually crawl toward it, Professor Parker explained. Their actions should be regarded more complex than a simple response to light, for the retinas of their eyes respond to the details, such as blue color, rather than to the image as a whole.

NINETY-EIGHT bushels per acre is the average yield of potatoes in the entire United States for the past ten years.

THE per capita consumption of meat in the United States has been increasing since 1915, with the exception of 1917, and it is estimated that the 1922 consumption will slightly exceed 150 pounds per person.

THE new Poland is more than half as large as Texas and its population is about a fourth as large as that of the United States.