SCIENCE NEWS

Science Service, Washington, D. C.

STATIC AND HURRICANES

STATIC, the bane of the radio fan who wants to get distant stations, may prove a valuable warning of such storms as the disastrous hurricane which struck Miami last September, according to a study made by the Hydrographic Office of the U. S. Navy.

Beginning in March, 1924, the U. S. S. *Kittery* was used in a study of the value of weather maps in navigation. Before the experiments had been under way very long, it was noticed that there was a very definite relation between the state of the atmosphere, as recorded in the data for weather maps broadcast from the naval radio station at Arlington, and the static. Later, when the weather maps were broadcast and received by means of the machine invented by C. Francis Jenkins, where a duplicate of the transmitted map is automatically drawn on the ship, it was found that the receiver could be used to record static.

The Jenkins machine is used in connection with a radio compass. The latter device is equipped with a loop antenna so that signals may be recorded from one definite direction. As the loop is rotated, and peals of static in any direction are detected by the receiver, corresponding ink lines are drawn on the paper-covered revolving drum of the Jenkins machine. In the time that it takes the recording pen to travel from one end of the drum to the other, the loop is turned through a complete circle, so that the paper gives a graphic picture of the static in any direction from the observer.

The Kittery was fortunate enough, from the scientific viewpoint, to be in the path of the Miami hurricane of September, which was preceded by another hurricane that swept over Bermuda. On September 14, when *The Kittery* was east of Nassau, the Bermuda hurricane was a few hundred miles to the northeast and the Miami hurricane was approaching St. Thomas. The maximum of static was from the direction between these two storms. As the ship sailed south, and the Miami storm came nearer, while the Bermuda one went out of range, the static in the direction of the former became more intense. Finally, on September 16, after *The Kittery* had reached Cape Haitien, at the northwest tip of Haiti, and had made necessary preparations for rough weather, the ship and the storm met. The static was terrific in all directions.

By September 18, when *The Kittery* was at Guantanamo, Cuba, and the storm was 600 miles distant, having crossed the Florida peninsula, there was relatively little static, except in the direction of the storm. Following the low pressure area of the hurricane came one of high pressure and on the morning of September 24, when *The Kittery* was near St. Thomas, no static whatever was recorded, the only time during the entire month that such a condition prevailed. Then, as the vessel started to sail northwest again, towards Cape Hatteras, another disturbance began to develop near Grand Turk Island, and maximum static was recorded in its direction.

Such hurricanes as the Miami one develop in the doldrums of the Atlantic Ocean, off Cape Verde, the western tip of Africa, several weeks before they hit the United States. The Miami hurricane, for example, began about September 5, though it did not reach Florida until September 18. It is suggested that a group of radio compass stations located, perhaps, at San Juan, P. R., a point in the Barbadoes, and Trinidad, would be able to detect these storms as they approach. With three stations, where the lines from each cross would be the center of the storm, so that its position could be accurately plotted and sufficient time for warnings and preparation could be allowed.

The Bureau of Engineering of the Navy Department is now working on a further attachment for the recording device which will record the intensity of the static in each direction, with which, it is expected, still more reliable results may be obtained. An interesting fact learned in the data already obtained, however, with regard to the intensity of the static, is that it is much weaker than signals from powerful transmitting stations.

THE HELIUM SHORTAGE

AMERICA faces a helium shortage. And helium is the unburnable gas that, although undiscovered on earth before 1895, is used to inflate dirigibles and thus keep them from exploding as those filled with hydrogen are likely to do.

The natural gas from the Petrolia, Texas, field which has provided helium up until now is playing out. Since congress has authorized the construction of two giant dirigibles, each 6,000,000 cubic feet capacity, to cost $8,000,000, lack of helium is worrying government officials. The Navy and the U. S. Bureau of Mines are asking congress to appropriate money to pipe to the Fort Worth, Tex., helium extraction plant, built during the war, the helium-bearing natural gas of Nocona, only 25 miles from Petrolia.

The appropriation desired is $500,000 which is needed to construct the necessary pipeline and pressure plant. The bill is now awaiting action by the senate. Once the money is appropriated it will be a matter of only six or seven months before the helium supply can be increased.

The Nocona field was discovered in 1922, but natural gas, although burned in the field, has never been drawn away. The life of the Nocona supply is about 15 years and it will probably produce from 10 to 12 million cubic feet of helium a year during that time.

More helium is essential with the construction of two giant dirigibles in view. There was never enough helium to float the *Los Angeles* and the *Shenandoah* simultaneously. With the destruction of the *Shenandoah* the world's largest single store of pure helium was lost. Each of the projected giant dirigibles will need three times the helium now being used by the dirigible *Los Angeles.*

X-RAYS AND CROP SEED

X-RAY treatment of seeds, hitherto regarded as invariably harmful in its effects, is now declared beneficial by Dr. M. Jacobson, a plant physiologist, of Camden, N. J., who claims that he has obtained greatly increased yields from seeds subjected to mild doses of "soft" X-rays. The difficulty with the earlier experiments, he states, has been that the rays were used in the harmful "hard" wavelengths, or that the exposure was continued too long.

In one series of experiments which he reports, potted plants grown from rayed seeds grew faster and more vigorously than those grown from unrayed seeds, they flowered and fruited from one to three weeks earlier, and their yield was from 15 to 170 per cent. greater, the fruits being always more numerous and often larger individually.

Seeds were not the only things that benefited by X-ray treatment, Dr. Jacobson says. Potatoes raised from treated tubers gave, in three separate field tests, increases in crops of 35, 107 and 170 per cent. over plantings of untreated tubers. Further tests showed that light has an unfavorable effect on X-rayed tubers and bulbs, which the experimenter states should be protected from the sun after raying if large increases in yield are to be obtained. Time, however, seems to have little effect in diminishing the effect of the raying, for seeds and potato tubers kept for as much as three months after treatment yielded almost as well as did those planted immediately after exposure to the rays.

TYPHUS FEVER IN THE UNITED STATES

IS the louse to be exculpated from its time-honored rôle as the transmitter of typhus fever? The United States is fairly free from this scourge of the old world except where an occasional immigrant brings it in or it creeps across the border from Mexico. Recent epidemics in the southeastern states, however, have aroused considerable concern among epidemiologists.

Dr. Kenneth F. Maxcy, formerly assistant surgeon-general of the U. S. Public Health Service, has completed a survey of carefully collected data on typhus epidemics in Alabama between the years 1922 and 1925 that show that this disease when it shows itself here varies rather strikingly from the form known in Europe.

In the first place, Dr. Maxcy concludes, in only one or two isolated instances could lice, the well-known carriers of typhus in the old world, be considered as the infective agents. The disease seemed to single out native white Americans of respectable station and contrary to precedent did not pick out the poor or the uncleanly. Nearly twice as many men as women were infected and the Negroes were almost entirely immune.

In the second place it reached its maximum in Alabama in the summer and fall whereas typhus has long been associated in Europe with winter and early spring. There were not sharply localized neighborhood outbreaks, continued Dr. Maxcy, but the evidence in hand indicated that people engaged in trade, especially those employed near groceries, feed stores and restaurants, were the classes most often infected. There was comparatively little secondary infections of other members of the same family, but several cases occurred on the same premises at widely separated intervals.

Both from clinical and experimental evidence this disease seems to be identical with old world typhus but is milder and not so often fatal, according to Dr. Maxcy. The louse seems to be excluded as a carrier in America, but it is thought probable that some other agent, such as rats or mice, act as reservoirs of the virus and transmit it to man.

THE FEEDING OF CATTLE

ELECTRIC heaters, fans and a complex system of artificial ventilation help make life endurable for a selected group of shorthorn steers, while scientists study in detail how the fodder they eat is transformed into energy.

At the Nutrition Laboratory maintained at Boston by the Carnegie Institution of Washington, experiments are in progress under the direction of Dr. Francis G. Benedict and Professor Ernest G. Ritzman, of the New Hampshire Agricultural Experiment Station, to find out just how much or how little food cattle need to carry them through the winter. The cattle are confined in a boxed-in stall and everything that goes in and everything that comes out is analyzed and weighed.

The ability of wild animals to adapt themselves to an irregular food supply plus the results of some diet reduction experiments with college students suggested to the investigators the idea that livestock may possess unexpected power to resist undernourishment. It was thought that this adaptability, if true, might be utilized by the farmer in stock-feeding.

Though the results of the experiments are not absolutely conclusive, Dr. Benedict and Professor Ritzman have definitely established that adult steers can be carried through the winter on extraordinarily low rations without affecting their general health or without lessening their power to regain normal weight.

Heretofore, no attempts have been made to measure the energy metabolism of fasting cattle because the huge mass of food that store up in the stomach supplies them with nourishment for days. The studies recently made, say the experimenters, make it clear that both underfeeding and fasting present entirely new problems in nutrition. It is hoped that the facts learned about what happens when an animal converts raw, inert food into living tissue will be of material help in placing feeding standards for livestock on a more dependable basis.

THE CORN BORER

THE United States has officially declared renewed war upon a foreign invader. By authorizing the appropriation of $10,000,000, almost the cost of a first-line armored cruiser, congress has recognized the menace, not of armed men, but of an army of insects, the European corn borers. The stake of the battle is the corn crop, valued at $1,703,430,000 for the past season.

The corn borer is a strong fighter and has gained an almost conclusive victory in Canada, where it has reduced

the corn acreage 90 per cent. Although it is in this country to stay, it has been the hope of government entomologists to keep it confined to states where it will do the least damage and to keep it out of the great corn belt. The borer has been getting nearer and nearer to the corn belt and just recently took its first plunge deep into this sector, appearing in Kankakee County, Illinois.

Annually, the U. S. Bureau of Entomology gets an appropriation from congress for research and quarantine work. Ten million dollars is now asked for an experimental campaign in improved crop methods. It is a clean-up campaign to reduce the chances of spread by reducing the number of borers present in infested areas. The money is wanted at once, for the work must be done by June first. The bill just passed is an authorization bill and must be followed by the actual appropriation of funds. This is unlikely to happen before March, when the last deficiency bill will come up before congress. And so the government, although pledged to war, is stalled for lack of actual funds. The corn borer waits not for any man.

EXPLORATIONS IN CHINA

IGNORING the fighting spirit of the Chinese crowds and their antagonism towards foreigners, Dr. Sven Hedin, the Swedish explorer, is preparing to set out from Peking on a long expedition to the interior deserts of China. Reports just received in this country state that by the end of April Dr. Hedin's caravan of camels will enter the desert from Paoto, the terminal of the Western Chinese Railway.

In the first year of the expedition, the party will study chiefly the climate and geographical features of Mongolia, Chinese Turkestan and the province of Kansu in northwestern China. Weather records will be made from five stations during at least a year and a half, in order to analyze climatic conditions in the large desert belt of Central Asia.

The desolate high plateau of inner Asia, now barren of life, was once a melting pot for people of Greek and Mongolian origin. Dr. Hedin expects to seek out the ruined settlements and strongholds and the ancient graveyards of these ancient races, and hopes to bring out of Chinese Turkestan collections that will shed new light on the history of the human race in this little-known region.

In spite of diplomatic difficulties in China, the Hedin expedition is of an international character. Two prominent Chinese scientists, a geologist and paleontologist, are to join the expedition. The American and English anthropologists at the Peking Union Medical College arranged to cooperate with the expedition in studying the evidences of Stone Age life from the desert region. Young Swedish students of archeology and geology will accompany Dr. Hedin.

This is Dr. Hedin's third venture into the interior of Central Asia. His first expedition, thirty years ago, was daring pioneer adventuring into a country wrapped in mystery and danger. His second expedition, in 1906, led him to the source of the Bramaputra River among mountains far in Tibet. Dr. Hedin is now sixty-one years old.

ITEMS

THYROXIN, the hormone of the thyroid gland, has been made synthetically for the first time in the laboratories of University College, London, according to reports just received by the American Medical Association. Dr. C. R. Harington and Professor George Barger are the workers who have achieved this result from researches supported by funds supplied by the Rockefeller Foundation to the University College Hospital Medical School in 1920. The hormone, which is used in treating patients with a defective thyroid gland, was first isolated by Dr. E. C. Kendall, of the Mayo Clinic, in 1917. Its production synthetically from coal tar products and iodine will assure an absolutely even standard and should have the effect of making the price much lower.

THAT diabetes, heretofore considered a disease of disarranged metabolism, is caused by an ultramicroscopic germ or filterable virus is suggested by experiments on rabbits reported to the American Association for the Advancement of Science by Dr. D. H. Bergey, professor of hygiene and bacteriology of the University of Pennsylvania. By infecting rabbits with carefully filtered secretions from diabetic patients, Dr. Bergey was able to produce the first stages of diabetes in the animals. He also found that the infective agent increases in strength when it is cultured in broth, just as well-known visible germs do. Dr. Bergey called attention to the astounding doubling of the diabetes death rate in the first twenty-three years of this century and declared that since neither bacterial nor protozoal cause for diabetes mellitus had been discovered, this increase "indicated some definite toxic action and suggested the possibility that a filterable virus might be the responsible agent." In testing this idea, Dr. Bergey found that inoculated rabbits developed the diabetic symptoms of sugar in their secretions in one to three weeks and continued to show sugar at irregular intervals, indicating that diabetes had set in.

DOG vaccination for rabies may become compulsory when a standardized vaccine has been achieved. Experiments to determine the efficiency and permanency of canine vaccinations are about to be undertaken in federal, state and New York City laboratories, according to a statement issued by the New York City department of health. Over 100,000 dogs have been vaccinated in Tokio and Yokohama between 1919 and 1924, according to Dr. Hideyo Noguchi, of the Rockefeller Institute for Medical Research. Of these only 41 have subsequently developed rabies. Among one third as many unvaccinated dogs in the same cities there were 16,991 cases of rabies during the same period.

THE ultra-violet radiation in sunshine may be a great help to birds and beasts and man but fish fail to appreciate these invisible rays. Experiments undertaken at a Vermont hatchery, reported to the U. S. Bureau of Fisheries, definitely establish that sunlight is harmful rather than helpful to fish. Almost twice as many young fish died in troughs of water exposed to direct sunlight as those in troughs left in the shade. The experiments were repeated with different ages and different species with sometimes an even greater mortality in the unshaded troughs.