SCIENCE NEWS

UNUSUAL WEATHER CONDITIONS

Science Service

UNUSUALLY warm water in the northwestern Atlantic ocean and especially over the Grand Banks of Newfoundland is considered by U. S. Weather Bureau experts as a very likely cause for one of the wettest months of May in years. The presence of this warm region in the Atlantic was discovered by U. S. Coast Guard cutters on the International Ice Patrol and was first reported by Science Service.

An abnormal number of areas of low barometric pressure, or general storms, have crossed the United States during the past few weeks. Their course has been unusually far to the south for the time of year, causing warm, moist south winds bringing rain to nearly all the country east of the Mississippi river.

The reason for the southerly track of these storms is stated by the Weather Bureau to be a big low-pressure area which has settled down over the Grand Banks for weeks. Such a distribution of the pressure of the atmosphere causes northerly winds along the northern border of the United States, bringing cool air currents which serve to push the eastward moving lows farther to the south, and which also by running under and pushing up to the cold regions of the upper atmosphere the moisture-laden winds from the south cause frequent and abundant rains.

The reason for this persistent low-air pressure over the Grand Banks is said by the Weather Bureau to be probably due to the reported warm water in that region. The Ice Patrol reported several weeks ago that the temperature of the ocean water over the whole area of the banks, a matter of thousands of square miles, was 7 degrees warmer than normal for the time of year. Warm ocean water means that the air above it is warmer. Warm air weighs less than cold, hence warm ocean water is apt to be covered by a region of low air pressure such as has actually been present near Newfoundland. The ultimate reason for the warm ocean water is unknown; nor would the Weather Bureau make any prediction as to when or how the present run of bad weather over the east would break up.

The month has been wet everywhere east of the Mississippi, but to the westward dry weather has been the rule. Cool weather has prevailed generally east of the Rocky Mountains. Planting of corn and cotton has been seriously delayed in the east, but small grains, potatoes and fruits has been generally benefited. In the western portions of the corn belt and of the wheat-growing sections, cool dry weather has retarded crop development.

SURVEYING WITH RADIO AND SOUND WAVES

Science Service

A NEW method of marine surveying using both radio and sound waves has been developed by the U. S. Coast and Geodetic Survey with the cooperation of the U. S. Bureau of Standards, and is now being used in surveys of the Oregon coast. It may be used even in a dense fog and is as accurate as any of the usual methods of sight surveys at sea.

The method depends on the velocity of sound through the sea water which, if known, enables the operator on shipboard to fix his distance from two or more known positions on shore. A simple calculation then permits him to work out his own position. In this method a bomb fired under water near a vessel sends out a sound wave which travels till it reaches an underwater telephone near and connected by cable with a shore radio station. The sound itself by means of suitable apparatus sends back a radio signal to the ship in such a way that, while there is a delay in the return of the signal, this delay can be accurately measured and the result is the same as if there were no delay whatever.

The procedure has been worked out especially for application to surveys to be made along the North Pacific Coast where weather conditions make difficult or even impossible ordinary methods of surveying during a large part of the year. In winter the sea is usually too rough to permit accurate work, while in summer when the sea is smooth, fogs and haze abound, cutting off visibility and making sight surveys impossible much of the time. The Coast Survey steamer Guide is now at work off the Oregon coast, using Marshfield as a base.

As to the accuracy of the method, Commander N. H. Heck, who has been supervising the work, states that at a distance of 10 miles from shore it gives the position of the bomb explosion to within a circle whose diameter is the length of the survey ship. This is accurate enough, for the best surveys giving the positions of rocks or other dangers to navigation.

A less accurate modification of the method, cutting out the expensive chronograph on the ship, may be of practical use in navigation. Use of a stop-watch for timing would give an error of at most two tenths of a second, which would enable a vessel captain to work out his position with sufficient accuracy for ordinary navigation.

As to the distance from shore at which this method of sound ranging is practicable, Commander Heck said that during experimental work in Long Island Sound last fall, a small bomb was distinctly heard at a distance of 55 miles.

HIGH ALTITUDE PHOTOGRAPHY

Science Service

A PHOTOGRAPH of the surface of the earth taken from the highest altitude at which any such photograph has ever been made is now on exhibition at the War Department in Washington. The picture is of Dayton, Ohio, and it was taken from 32,220 feet above sea-level by Lieutenants Macready and Stevens, of the Army Air Service, at 11 a. m. on May 2. The altitude is a little more than six miles above Dayton.

Although the usual ground haze was present when the picture was taken, it is exceedingly clear in definition, and automobiles and street cars can be distinguished in the streets six miles beneath the camera. This result was accomplished by use of a "minus blue" ray filter, which cuts out the blue light of the ground haze. Super-speed film was used, enabling the employment of a very deep ray filter, giving exceptional clearness. As the temperature was 62.5 degrees below zero Fahrenheit when the picture was taken, special electric warming devices had to be used for the camera as well as for the aviators.

According to the experts of the Army Air Service, the use of ray filters to cut out ground haze makes it possible to take pictures of equal clearness at any practicable altitude. The haze occurs up to an altitude of from 8,000 to 10,000 feet, above which the atmosphere is exceedingly clear. The problem is merely one of using a camera with focal length sufficient to get a clear focus on an object six miles or more away. With a focal length of 20 inches they could take a clear picture of the ground from a height of 48,000 feet.

THE NATIONAL CONFERENCE ON OUTDOOR RECREATION

Science Service

OUT-OF-DOOR recreation is now a matter in which continued interest on the part of the federal government and numerous organizations is assured.

As the result of the National Conference on Outdoor Recreation, held in Washington, at the call of President Coolidge, a permanent organization has been effected which will result in a regular annual conference of government representatives, naturalists, scientists, forestry and park experts, sportsmen and representatives of all organizations interested in playgrounds, scout movements, child welfare and other such activities.

At the conference the wild-life and scenic resources of the country were surveyed by delegates from scientific institutions and national and state parks. Every city and town was advised by resolutions of the conference to secure for the general recreational use of its people a piece of land which would be maintained in its wild state as nearly as possible. Action leading to the preservation of wild animals and wild flowers was also recommended.

As the executive committee of the permanent conference, the following were chosen: Chauncey J. Hamlin, New York; Dr. Vernon Kellogg, California; Colonel W. D. Martin, Washington, D. C.; Dr. John C. Merriam, California; John Barton Payne, Illinois; Mrs. Jane Deeter Rippin, New York; George Scott, Illinois; Charles Sheldon, Washington, D. C.; Mrs. John Dickinson Sherman, Colorado; George Shiras, Michigan; James E. West, New York.

THE DETECTION OF MINERALS BY ELECTRICAL METHODS

Science Service Correspondence

UNIQUE methods of electrical sleuthing have resulted in the first discovery of arsenic deposits in Sweden, together with new discoveries of large iron pyrites and copper deposits. A request has been made by the government Board of Trade to the Swedish Riksdag for appropriations to carry on further investigations.

The new mineral finds are in Vaesterbotten Province in the northern part of Sweden. According to preliminary estimates, the new mines when worked will yield annually 350,000 tons of pyrite, 25,000 tons of copper ore and about 40,000 tons of arsenic ore. The last-named ore contains about 30 per cent. arsenic. This discovery is of great industrial significance as Sweden has hitherto been entirely dependent on imports of the commodity. The newly found copper ore contains from 4 to 8 per cent. of copper, while the iron pyrites will yield from 40 to 45 per cent of sulphur.

The method by which the ores have been detected has been invented and employed by Karl Sundberg, a Swedish mining engineer, and illustrates how far this branch of science has advanced since the days of the hazel bough. The testing for ore is made entirely by the use of electrical instruments which indicate not only the whereabouts of ore, but also its nature and quantity. In connection with these tests Mr. Sundberg has engaged in some geologic sleuthing. Whenever he has discovered stray blocks of ore near the surface he has assumed that these have been carried some distance by glaciers, and has consequently assumed the existence of extensive deposits in the direction from which the glacier has apparently moved. This theory combined with the electrical detecting has led to the rich results now reported.

A NEW PROCESS FOR CLEAR FRUIT JUICES

Science Service

PERFECTION of a new process for making apple and grape juice of pleasing color and free from cloudiness has been achieved at the Department of Agriculture.

The new process will make possible the manufacture of juice in large quantities and will cause the use of many varieties of fruit which can not be employed to advantage at present, according to L. C. Corbett, of the Office of Horticultural and Pomological Investigations, who has had charge of the experiments.

Many of the so-called fruit juices on sale at the soda fountains and soft-drink counters are composed of water and sugar with the addition of various flavoring and coloring substances. They are pleasing to the eye and agreeable to the palate, but they possess little or no food value and have practically none of the essential qualities of a natural fruit juice.

The natural juice is very complex in its structure. In addition to the substances which give to it the characteristic flavor and aroma, various gums and gelatins are held in suspension which are difficult to remove and which make the juice turbid and uninviting in appearance.

For several years the Department of Agriculture has been investigating the problem of removing these objectionable elements from the unfermented juice without affecting its quality and color or impairing the taste. It is a problem of many angles. Some varieties

of apples, for example, will yield to one method, while others require different treatment.

To make its strongest appeal to the palate of the user, a fruit juice must contain, in addition to its characteristic flavor and fragrance, sugar, tannin and acid in a rather definite ratio. Not many fruits possess these constituents in the proper proportions, and to secure the desired result it is usually necessary to blend or mix the juice of two or more varieties.

By careful selection and combination the department has succeeded in producing an apple juice which is perfectly transparent and of a beautiful color. It retains all the valuable properties of the juice, and will keep indefinitely without fermentation. It can be manufactured in large quantities with the certainty of securing a standard product.

Equal success has attended the experiments with grape juice. By the process employed in the department many varieties of grapes which have not been used on account of the unattractive appearance of the juice can now be made to yield a drink of the highest quality, both as to appearance and flavor.

SUGAR FROM CORN

Science Service

SUGAR from corn may soon be a reality on American breakfast tables. By a process devised at the Bureau of Chemistry, U. S. Department of Agriculture, maltose, an edible sugar, much sweeter than glucose, has been made from cornstarch. It may also be made from hominy or tapioca.

The process does not depend upon chemicals, but is in many respects similar to the natural conversion of starch to sugar in the cells of living plants or animals. The cornstarch is merely mixed with warm water to which malt has been added and the resulting product subjected to the same processes of clarification and evaporation required in the manufacture of cane sugar from sugar cane or sugar beets.

This action of malt has been known to chemists for many years, but has hitherto not been susceptible to commercial production. In practice the results were very uncertain and frequently the whole batch of material spoiled. But now the secret cause of all these troubles has been discovered by H. C. Gore, of the Bureau of Chemistry, and production of maltose from corn on a commercial scale equal to that of glucose is regarded as more than a possibility.

Too many hydrogen ions, not too many cooks, is what spoiled the broth of earlier workers, Mr. Gore found. Hydrogen ions are electrified hydrogen atoms. They split off from many chemical substances in solution, chiefly from acids. They make things taste sour. It is necessary to carry on the reaction in the presence of a certain and carefully controlled proportion of hydrogen ions.

Maltose, although a sugar, is not the same as cane or beet sugar. Neither is it the same as glucose. It is more than twice as sweet as glucose and about three fifths as sweet as cane or beet sugar. It is as wholesome and nourishing as they are.

The United States now consumes about 5,600,000 tons of sucrose, the sugar made from cane and sugar beets. Of this 2,800,000 tons are imported. In addition, we eat in the neighborhood of 1,000,000 tons of glucose. The importance of Mr. Gore's discovery lies in the possible replacement of some of the imported sucrose or home-made glucose by maltose, which is cheaper than sucrose, sweeter than glucose and apparently easier to prepare and which can be produced from the almost inexhaustible source of American grown corn.

Commercial interests are showing interest in Mr. Gore's discovery and in one instance have offered part of their plant equipment for further experiments on a large scale.

ITEMS

THE ninth flight made by Dr. C. L. Meisinger, of the U. S. Weather Bureau, in his series of free balloon journeys taken as part of a study of the atmosphere, ended at Roseville, Ohio, about ten miles south of Zanesville, at 10:20 A. M., May 23. The balloonist and his army air service pilot were in the air a little more than 19 hours after leaving the earth at Scott Field, Belleville, Ill. The distance was about 425 miles. For their next flight, which will be undertaken in a few days, the balloonist will use an 80,000 cubic foot balloon, and hope to be able to remain in the air for two full days.

A REMARKABLE combination of a submarine earthquake and phosphorescent seas has been reported to the Hydrographic Office. The stirring up of the ocean brought so many light-emitting organisms to the surface that the British steamer *Trefusis* on her way from Aden to Colombo seemed to be steaming across a snow-covered plain. It was during the middle watch of March 18, a dark night, quiet sea, and as usual in the northern Indian ocean, the wake of the ship rather brilliantly phosphorescent while the rest of the sea was dark. Just before four o'clock a distinct tremor was felt, followed quickly by others, as if a series of mines were being set off at great depths. Immediately, great patches of light rose to the surface and spread in all directions until for miles around the ship the whole ocean was a brilliant foaming glitter of phosphorescence, the pale blue glow lighting the decks of the vessel with a weird light.

HAFNIUM, the youngest member of the family of chemical elements, is by no means a rare metal, according to figures recently announced here by Messrs. G. von Hevesy and V. T. Jantzen, at the Institute for Theoretical Physics. This condition was suspected by scientists many months ago, when hafnium was discovered. Analyses of minerals from distant parts of the world now show the new metal existing in liberal proportions. Ores from Brazil, France, Greenland, Madagascar, Norway, North Carolina and other locations show from one to five per cent. hafnium. One sample—the mineral alvite—from Kragero, Norway, carried 16 per cent. of the new element. An estimate is made that 1/200,000 of the earth's crust is hafnium. This small fraction represents a large amount of material when the stupendous weight of the earth is taken into account. Hafnium long escaped detection because it was mistaken for zirconium, a metal which usually accompanies it.