SCIENCE NEWS

THE NEW HARVARD OBSERVATORY

Science Service

A NEW astronomical station of the Harvard Observatory, equipped with two photographic telescopes, has just been installed on the edge of the nitrate desert of northern Chile to test the atmospheric conditions in that locality, and to watch and photograph the southern stars that can not be studied at the existing stations of the observatory at Cambridge, Mandeville, Jamaica and at Arequipa, Peru.

For more than thirty years Harvard has maintained a southern station in order that its series of celestial photographs might cover the whole sky. After the investigation in 1889 of various sites in Peru and Chile, the branch observatory was located in the Andes Mountains near Arequipa, at an altitude of eight thousand feet. Throughout a large part of the year the astronomical conditions in this high altitude are excellent, and the astronomers working at Arequipa have secured more than a hundred thousand photographs of southern stars. During the Peruvian summer, however, in the months from December to March, a heavily clouded season prevails. The continuity of the photographic record is then so badly interrupted that it has now been decided to test other sites in the hope of finding a favorable place that may be occupied during the cloudy season at Arequipa.

A southern station of the Astrophysical Observatory of the Smithsonian Institution has been located for a few years on a mountain near Calama, Chile. The climatic conditions there have proved to be exceptionally favorable for work on the sun. The new Harvard Observatory has been located at Chuquicamata, Chile, about twenty miles from the Smithsonian station, and at an altitude of between seven and eight thousand feet. The region is practically rainless, and the available records indicate long seasons of cloudless skies.

A ten-inch photographic telescope is being used for the study of variable stars in the southern Milky Way, and in the Magellanic Clouds. A special telescope with wide-angle lens carries on the photographic patrol of the whole southern sky, an investigation long maintained by Harvard in order to have a continuous record of the variations or of any unusual behavior of the brighter stars.

THE USES OF CHROMIUM

Science Service

CHROMIUM, a metal almost unknown 40 years ago, is now declared to be one of the indispensable elements in modern industry by Clifford B. Bellis in a report on the present uses of the metal to be published in the next issue of *Chemical and Metallurgical Engineering*. Stainless steel and high-speed steel are two of its many useful applications.

For chromium is a sociable sort of element. It is of little value alone, while as an alloy or companion of other metals it does indispensable work. Alloyed with iron it makes a steel that is both hard and tough, and so has made possible the development of many characteristically modern appliances.

It is estimated that without chromium high-speed steel tools, the works of the Ford company, at Detroit, would have to be seven times their present size, and it is certain that without the use of chrome steel in automobile engines, the motor car would be a very heavy and cumbersome contrivance. Airplanes such as we know them would be impossible.

Stainless steel is produced by alloying steel with about 15 per cent. of chromium; and rustproof iron contains about the same proportion although with a less amount of carbon.

Metallic chromium is now made in the electric furnace and has a number of useful applications. It has been found to have nearly the same coefficient of expansion as platinum and so is being used to some extent as a substitute for the more expensive metal in work requiring the sealing of metal with glass. Malleable chromium wire is being made by plating a copper wire with chromium, drawing down, replating, and continuing the process until the interior copper core is of negligible cross-section.

ROAD SURFACES

Science Service

AUTOMOBILE roads in New York are now being required to write a record of their roughness. An automatic autographic testing device which reveals the bumps in the road and records the amount of such irregularities has been adopted by the state, Colonel Frederick Stuart Greene, superintendent of the Department of Public Works, announced through the *Engineering News-Record*.

Harley Dunbar, one of the state's engineers, is the inventor of the instrument which is installed near the dash board of a car, where it is in plain view of the observer. Cars equipped with this device are simply driven over a pavement at twenty to thirty miles an hour. When either front wheel strikes a hole or a bump in the pavement the motion is transmitted to the pencils of the instrument causing them to draw on a small moving paper chart an irregular or straight line according to whether the road is rough or smooth. It is so arranged that the observer can make notes on the chart. The device constantly adds up the irregularities transmitted to the pencils, so that if the dial is read at the beginning of the road and at any time thereafter, the difference between the readings gives the amount of irregularities in the pavement.

According to Colonel Greene, before pavements are now accepted, they must pass the test with this instrument. From experience, he says, the department has found that the practical allowance for irregularities per mile for the various types of pavement, as shown by use of this machine on experimental roads, is for concrete, brick or asphalt block 50 inches per mile of pavement, for bituminous macadam mixing method 75 inches, and for bituminous macadam 125 inches.

"We feel," Colonel Greene states, "that the use of this machine and the limitation of surface irregularities so that they shall not exceed the specified inches per mile will not only result in a much better pavement, so far as riding qualities are concerned, but will give the state a longer life for its roads."

RESUSCITATED FISH

Science Service

EXPERIMENTS conducted at the Atlantic Biological Station, St. Andrews, N. B., by Dr. S. W. Britton, on the degree of heat or cold a fish can withstand, show that it may be chilled to the extent that its heart stops beating and the whole body is stiff and numb, and then if the temperature be raised, it will soon recover.

The experiments were performed on flounder, eel, cod, skate, etc., which were living normally in a tank of water having a temperature of about 65 degrees Fahrenheit. From this they were transferred to cooling or warming tanks, the temperature of the water being gradually lowered or raised. In the cooling tank the water began to freeze at about 29 degrees. In this the fish could survive for a short time. Regardless of whether the cooling was slow or sudden, they would gradually stiffen. The heart was the last organ to succumb. They were kept in the water in this condition for from one to several hours, after which they could be resuscitated by raising the temperature.

The opposite extreme was 80 degrees Fahrenheit. With the gradual increase of temperature the fish showed restlessness and excitability. At 75 degrees respiration became difficult, but if the water was kept at this point a gradual adjustment took place and the fish got along quite comfortably after a while. When increased, however, respiration ceased and the heart stopped beating. The fish could be revived by lowering the temperature of the water or transferring them to a cooler tank.

DOMESTICATED OYSTERS

Science Service

THE domestication of the oyster has been accomplished and there is ground for hope that the threatened extinction of this important and delicious sea-food has been indefinitely postponed. The achievement is the work of the New York State Conservation Commission. Dr. Willian Firth Wells, biologist to the commission, has devised a method for the successful commercial application of well-known laboratory methods of oyster propagation and culture, and the new methods will be tried out on a large scale during the coming season.

Unlike fish, oysters have hitherto not been susceptible to artificial propagation. The minute size of the delicate, free-swimming oyster larvae has been the most serious obstacle, and a deplorable one, for oysters when "set" are a stationary and therefore an important commercial "crop." It is the decline of this crop which has caused millions of dollars loss to states through the decline in the value of the rentals of oyster beds, to the growers through loss of their crop, and to the public through higher prices.

In order to remedy this acute situation, the New York State Conservation Commission has been conducting an experimental shellfish hatchery at Bayville Bridge, Long Island. Ever since Professor W. C. Brooks, of the Johns Hopkins University, showed in 1879 how easily millions of eggs could be artificially fertilized and carried through the initial stages of development, it has been the dream of biologists to propagate oysters as other fish are propagated. Dr. Wells has now applied centrifugal principles to concentration of the larvae and the setting stage has been finally reached with possibility of important commercial applications.

Although the principal demand at present is to increase the yield of seed, undoubtedly the next step will be to improve the quality of oysters. The selection of breeding stock will inevitably lead to favorable varieties, as this has always followed the domestication of animals and plants. True domestication is not complete until such control is within the power of the culturist. Experiments along this line have been very encouraging, and it is not too much to expect that we shall some day select shellfish varieties as we do oranges or grapes.

CARBONATED DRINKS

Science Service

SOFT drinks, if carbonated, are safer than uncarbonated beverages. Researches conducted at the Mellon Institute, at Pittsburgh, indicate that carbon dioxide in solution is fatal to bacteria and that carbonated beverages which when bottled were not bacteria-free become almost sterile after storage of some weeks. The higher the bottling pressure and the greater the amount of carbonic acid gas in solution, the greater is the germicidal effect.

The investigation was carried on by J. R. Donald and A. R. M. MacLean, of J. T. Donald and Co., of Montreal; and by C. L. Jones, industrial fellow of the Mellon Institute, who states that the average bottled beverage, when not carbonated, is a fine medium for rapid bacterial growth. Such beverages may become highly dangerous if originally contaminated with germs which cause disease. Carbonation prevents this, they declare, basing their opinions on a large number of experiments.

These indicate that a beverage carbonated and bottled under sanitary conditions and with sufficient pressure, remains in a sanitary condition and actually improves in purity with storage. The experiments also show, in the opinions of the experimenters, that the fatal effects on the bacteria are proportional to the amounts of gas used and to the pressure employed. Higher bottling pressures are therefore advocated in the interest of health.

The experimenters take pains to state that carbonization is not to be considered a substitute for cleanliness or the use of water or materials of doubtful purity. In such cases the initial contamination may be so high that in spite of the germicidal effect of the dissolved gas, the drink will be dangerous, especially if consumed soon after bottling. The alternative of pasteurization after bottling is not recommended since it is apt to cause changes in the beverage which are hurtful to appearance and flavor. In conclusion, the experimenters declare that:

"From the standpoint of the consumer, especially when in a strange vicinity with an admittedly doubtful or dangerous water supply, the chances of immunity from disease are better if one drinks only highly carbonated water or beverages."

PELLAGRA AND FOOD

Science Service

PELLAGRA may soon be an almost unknown disease. Surgeons Joseph Goldberger and W. F. Tanner, of the U. S. Public Health Service, in a report on the treatment and prevention of this disease, which while known all over the country has been especially prevalent in the south, state that fresh meat and fresh milk contain the essential preventive factors. A diet containing a quarter of a pound of lean beef, or a quart of milk a day will suffice as a preventive in all but very exceptional instances.

The milk may be taken either as sweet milk or as buttermilk, the preventive factors occurring in the protein of the milk. The butter fat, which is separated when the cream is removed, is without preventive power.

Eight victims of pellagra were treated by feeding them beef, and improvement followed in every case. The doctors emphasize that this is almost certainly not the only way in which immunity may be achieved, but they merely state that such a diet as has been described will prevent the disease. It even seems probable in their opinion that a much less amount of meat or milk will suffice, as an instance of which they cite the relative immunity of oriental races to pellagra in spite of a diet in which meat or milk forms a very small part. Other foods are apparently equally efficient preventives, but what these foods are is not as yet known.

But enough is now known, according to this report, to prevent the occurrence of the disease, to cure cases of at least moderate severity, and to establish that the primary cause of this serious and frequently fatal ailment is a faulty mixture of protein in the diet, or a deficiency in some dietary complex, possibly vitamin, rather than a germ infection or excessive consumption of starchy foods.

THE USE OF THYROID EXTRACT

Science Service

USE of thyroid extract as an anti-fat cure was condemned as dangerous by Dr. James H. Means, of the Massachusetts General Hospital, in a popular lecture at the Harvard Medical School on February 10.

"Thyroid reduces the weight all right, but how?" he said. "By intoxicating with an excess of the thyroid hormone. Stout people who take thyroid tablets to reduce their weight correct one evil, but a worse one is produced. Experiments show that when thyroid is used the pulse goes up, the individual gets nervous, perspires to excess and feels rather done up. Hard as it may be, the right way to treat obesity is through diet restriction and increased exercise."

Dr. Means told how the food consumed by a person is utilized as mechanical work or heat. The calories that a person uses can be determined by simply measuring the oxygen used by his lungs.

"The rate of combustion within the body of any given human or other warm-blooded animals measured under conditions of rest is remarkably constant if size be taken into account," Dr. Means said. "The performance of work and the taking of food markedly accelerate this metabolism, but if these factors are excluded, metabolism is found to proceed at a very even pace. We may compare the human or other warm-blooded animal to a lighted gas jet so arranged that it can not be completely shut off. We may open the cock wider and get a brighter flame, but we can not extinguish it.

"There is a fundamental minimal or basal rate of metabolism in the warm-blooded animal upon which the effects of other factors such as those of activity are superimposed. It is in the establishment and maintenance of this rate that the thyroid hormone plays its major rôle.

"In cold-blooded animals, the reptile, for example, there is no fundamental metabolic rate; the metabolism varies with the outside temperature. A snake has a fast metabolism and is highly active when warm, when cold its metabolism sinks to a very low rate and the animal goes into a lethargy. We find somewhat analogous phenomena in the human being when the supply of thyroid hormone is altered through disease, that is to say, an increased rate of metabolism when the gland is over active and a decrease when under active."

ITEMS

THE Governor-General of French West Africa has issued an order preventing the capture, detention and sale or exportation of living chimpanzees throughout the territory controlled by France, according to the Paris representative of the American Medical Association. Special permits to capture and export chimpanzees for scientific purposes may be secured by scientists and medical investigators. The permits are made out to individuals and are nontransferable. They are limited as to time, and the number of chimpanzees that may be captured is definitely stated. Furthermore, animals may be captured only with nets or traps, and not wounded. The new regulation is considered an important government recognition of the great necessity of animals for scientific experimentation.

PSYCHOLOGICAL laboratories for vocational guidance have been organized by the municipality of Berlin and are now giving advice to parents as to what occupations are most suitable for their children, the advice being based upon scientific study of the boys and girls. Many parents have sought the counsel of these laboratories which are using the most modern facilities of psychological research.

VESSELS at sea, especially those in extreme North Atlantic waters, may now obtain free medical advice by radio through the station at Thorshavn, Faroe Islands, about midway between Scotland and Iceland. The necessary advice will be furnished by the doctors at the hospital there. Messages may be in any Scandinavian language, or in English, German or French.