SCIENCE NEWS

Science Service, Washington, D. C.

QUARANTINE STATION FOR WORK ON PARROT FEVER

WHEN the U. S. Public Health Service's studies on parrot fever are resumed, it will be on one of the government's quarantine stations, probably either the one on Craney Island, near Norfolk, the one on Reedy Island in the Delaware River, near Lewes, or the one on Swinburne Island, New York City. A fourth location, an island quarantine station at Portland, Maine, is also under consideration, but is not favored so much as the other three, because of the severe winters there.

The selection of an island quarantine station has resulted from recommendations of the special board appointed by Surgeon-General Hugh S. Cumming to investigate the parrot fever situation at the Hygienic Laboratory, where eleven persons contracted the disease while the studies were going on.

The board reported that the present facilities at the Hygienic Laboratory are totally inadequate, and recommended that a new building be constructed. Pending this construction, thorough overhauling of the present structure, including painting, cleaning, etc., was advised.

The board further recommended that further investigations on parrot fever or similar diseases be temporarily carried out at an isolated place. The maritime quarantine stations, particularly those situated on islands, were immediately considered.

These have laboratory and hospital accommodations for handling cases of infectious disease coming in on ships. These facilities can readily be enlarged to take in the parrot fever investigations. The station at Reedy Island has the most convenient arrangements for quartering the investigators and their families, and the climate is not too severe. It is isolated, but not inaccessible at all. However, no decision has yet been made as to which station will be chosen for this work.

Neither have the men to carry it on been selected, although Dr. Charles Armstrong, who was conducting the parrot fever studies before he became ill, and Dr. L. F. Badger, who has collected blood from recovered parrot fever patients for convalescent serum, have been mentioned.

Dr. Armstrong is entirely well but still rather weak, as he has given blood several times for the serum with which other parrot fever patients are treated. It is expected that the parrot fever studies will be resumed within a week or so, as soon as the new location can be made ready.

No new cases have been reported in the last three days, and all the patients are doing well except the two Negroes, Fred Blackwell and C. Murphy, who are still quite sick.

Of the entire force of the Hygienic Laboratory, numbering about 120, ten have contracted the disease, and one died of it. In only two cases were the victims working directly on the disease.

PHYSIOLOGICAL EFFECTS OF ELECTRIC SHOCK

ALTERNATING current is more dangerous at low voltages than at high voltages and direct current is more dangerous at high than at low voltages. This is the curious conclusion reached by Professor W. B. Kouwenhoven, an electrical engineer, and Professor Orthello R. Langworthy, associate in neurology, following extensive studies on rats in the laboratories of the Johns Hopkins University.

The results of tests on 286 rats can not be applied directly to men or other animals. But the facts learned tie in well with existing knowledge of the effect of electricity on human beings. Statistics show that the annual death rate from electric shock is nine tenths per 100,000 and that one third of these fatal accidents occur on low voltage circuits.

"On high voltage circuits the victim is often thrown away from the conductors by the severe contraction of the muscles, but on low voltage circuits it is often impossible to let go," according to a recent report to the American Institute of Electrical Engineers. "No authentic record has been found, however, of a death on a 110-volt direct current circuit. If the skin is wet, 110-volt alternating-current house circuits are dangerous. The sensation produced by an alternating current of 15 to 20 thousandths of an ampere is extremely painful and a current of 100 milliamperes may cause death."

The tests on the rats were conducted at 110, the ordinary house potential, 220, 500 and 1,000 volts with both alternating and direct current. The animals did not die of heart failure but of respiratory failure.

In many cases the heart continued to beat long after the animal ceased breathing. In an effort to find these "changes in the nervous system incompatible with life," autopsies were performed on all specimens. They reveal that the death of rats which lived only a few hours after shock was caused by hemorrhages in the brain.

Contrary to popular belief, injuries were not directly proportional to the amount of current passed through the body. "Not only is the initial voltage of importance, but the duration of contact and the size of the animal."

The general effect of the alternating current shock was much more severe than that of direct current. Muscular contraction was more intense, more animals were paralyzed and gross injuries to the central nervous system occurred oftener. Among the animals shocked by direct current only one suffered hemorrhage in the cord and only one bled from the nose, while many alternating current victims were so affected.

The duration of shock was varied from five to sixty seconds at the lower voltages and from an instant to four seconds at higher potentials. If the animal was unconscious at the end of the shock, an attempt was made to revive it with a method as similar as possible to the Schaefer method of prone pressure resuscitation,

practiced widely for man. If this failed, the autopsy was performed immediately. Otherwise the animal was allowed to live normally a few days.

PARALYSIS FROM JAMAICA GINGER MIXTURE

INVESTIGATION into the nature of the poisonous substance in Jamaica ginger which caused paralysis outbreaks in Tennessee, Oklahoma, Kentucky and other states has been hampered by the absence of samples of the beverage that was actually drunk by any of the patients.

The drink was sold in small bottles containing from 60 to 80 per cent. alcohol. The rest was Jamaica ginger. Prohibition officials allowed this to be manufactured and sold thinking that the large amount of ginger would make it impossible for any one to use it as a beverage. However, several hundred hardy drinkers consumed it in large amounts. Some of the patients admitted having drunk as many as fourteen or fifteen bottles of the stuff in a day or two. Because of the small amount in each bottle, each was well drained, and official investigators have not been able to obtain any of the same beverage that was drunk. Their analyses have been made on samples furnished by the manufacturer, which are supposed to be from the same lot as that causing the paralysis.

In these samples, no metal, no alkaloid, no isopropyl-alcohol, no denaturant of any sort has been detected. The supposition is that either the samples examined were from a different lot than those drunk by the paralytics or the stuff was adulterated by a bootlegger. In Kentucky, near Berea and Richmond, the stuff was sold by a man in a car who collected cash payments for every bottle sold. This strengthens the bootlegger theory.

The fact that many of the paralytics are people of some prominence in their own communities has also hampered the official investigations. There is a natural reluctance to admit the drinking, and officials feel that probably some details are being withheld. While 119 cases have been investigated in Tennessee, official estimates place the number affected in that state at 400 or 500. In Kentucky, only 6 or 8 have been reported. These were mostly painters.

The paralysis set in as long as a week or even three or four weeks after the suspected beverage had been consumed. Some patients also complained of stomach and intestinal upsets. The paralysis affects the legs chiefly so that walking is extremely difficult or even impossible. However, there is sensation, and a pin prick or touch of a hand on the paralyzed leg is felt. Some patients have had paralysis of the fingers, enough to give difficulty in buttoning their shirts or handling small objects.

ZINC TREATMENT TO KILL WEED SEEDS

A METHOD of chemical weeding for seedling beds of evergreen trees has been worked out at the Northern Rocky Mountain Forest Experiment Station at Missoula, Montana. According to W. G. Wahlenberg, formerly of the U. S. Forest Service, who describes the work in detail in a new technical publication of the U. S. Department of Agriculture, this method saves 27 per cent. of the cost of producing two-year-old tree seedlings, besides saving many young trees that would be destroyed or damaged by the old laborious process of hand weeding.

The new method, as worked out during several years past at the Savenac nursery, consists in applying one and one eighth ounces of zinc sulfate dissolved in one quart of water to every four square feet of seed-bed soil. This attacked and poisoned the roots of the weeds as they tried to leave the germinating seeds. The roots of the sprouting evergreens were more resistant and were not injured. The situation was roughly analogous to that in the blood of a malaria patient who takes quinine. The drug kills the germs, but does not harm the body tissues.

During the experiments other chemicals were tried, but zinc sulfate proved to be the most effective. Higher and lower concentrations of the zinc sulfate were also tried, but the higher concentrations sometimes injured the tree seedlings, and the lower ones were not so effective against the weeds. The concentration to be used for best effect must depend partly on the nature of the soil. A finer-grained soil than the one at Savenac would require more of the sulfate, a coarser-grained soil less.

The method is not without its disadvantages, which must be guarded against. The sulfate tends to make the soil acid, and liming will need to be carried on in some localities to correct this. If the soil is stirred after applying the sulfate to the surface the effect is lost; weeds sprout readily in spaded or plowed places after treatment. Fresh treatment of a seed bed is therefore necessary every time a new lot of tree seeds is planted.

One incidental advantage seems to come from the treatment. After the seedlings are taken up and the soil re-plowed, field peas are frequently planted as a green manure crop. The residual zinc in the soil does not injure the peas but rather increases their growth, apparently through encouraging the colonies of nitrogen-fixing bacteria on their roots.

THE EUROPA AND THE BREMEN

THE arrival in America of the *Europa*, sister ship of the *Bremen* and second new speed queen of the oceans, focuses attention upon the great engineering and economic difficulties which for twenty-two years gave the speed honors of the seas to the British S. S. *Mauretania* and which are partially overcome by these German trans-Atlantic liners.

Application of the latest developments in power plant and ship design should enable the *Europa* and the *Bremen* to compete successfully with their rivals for the de luxe trans-Atlantic business which costs much per passage, but pays the steamship companies poorly. The success of faster ships yet to be built will depend largely on the advance of engineering and ship design and the amount of subsidy given their owners.

The *Europa* and the *Bremen* are streamlined both above and below water. Principles of airplane design have been applied to water craft. Both have a huge bulging nose, "bulbous bow," beneath the water and their rudders have been modeled very closely after airplanes. Oval funnels, well-rounded bridge and superstructure and sharply pointed bows are characteristic.

Light, welded rolled steel has largely replaced the heavy cast iron of older ships. The turbines are stronger and smaller and use more steam at higher pressures and temperatures to develop more power than their contemporaries. The efficiency of their oil-burning boilers far surpasses that of any other liners.

Even with these advanced engineering achievements, the *Bremen* burns approximately $6,000 worth of fuel-oil a day when oil costs $1.80 cents a barrel. But she uses only about 0.69 pound of oil per shaft-horsepower to the *Leviathan's* pound.

Possibly because they are the newest and grandest of the ocean-going palaces they can command a fair share of the select patronage. But they will have stiff competition and will make many trips with few passengers. One palatial liner with a capacity of more than 2,500 passengers averages during a year only about 1,250 on east-bound voyages. Very nearly the same is true of all the big vessels—the *Majestic, Berengaria, Leviathan, Aquitania* and *Mauretania.*

They largely pay for themselves by the publicity they bring their owners and nations, and this is expensive publicity. It has been carefully estimated that in the United States the *Europa* and the *Bremen* would have cost considerably more than $25,000,000 each. To build a ship that will add just three knots to their records would cost millions more. This ship would consume approximately twice as much fuel as the *Europa* or the *Bremen.*

To increase speed just 10 per cent., power must be increased 30, 40 and even 50 per cent., depending on hull design. This is well shown by tests on the airplane carrier *Saratoga,* one of the fastest ships afloat, which was built as a necessity with little consideration of cost. To make 22.57 knots the *Saratoga* requires 44,709 horsepower; to make 28.34 knots she needs 86,000 horsepower; 30.51 knots, 107,793 horsepower and 33 knots 155,843 horsepower. At 34.9 knots she is consuming approximately 213,000 horsepower, more than that developed in any hydro-electric or steam power plant in the world.

ITEMS

STARS larger than any now known may soon be found by astronomers at the Mount Wilson Observatory, using a new instrument that has just been put into use. It is known as the fifty-foot interferometer, and consists of a steel "bridge" 54½ feet long on which move mirrors to pick up the light of a star. With a smaller instrument of the same type, attached to the 100-inch telescope, the world's largest, F. G. Pease found the largest star known at present. This is Antares, in the constellation of the scorpion, and is large enough that if it were hollow it would hold the solar system with the earth and other planets out to Mars, with 55,000,000 miles to spare on all sides.

DETAILS of a new method for measuring the heart's output of blood were described by Dr. Arthur Grollman, of the Johns Hopkins University, at the Chicago meeting of the American Physiological Society. Four quarts of blood a minute is about what the heart pumps in normal persons. Of course the amount can not be measured directly, and various indirect methods are resorted to by physiologists. Dr. Grollman used acetylene gas. Making use of the fact that all the blood pumped by the heart goes through the lungs, he determined with a special apparatus the amount of acetylene gas the lungs took up in a given time. From this he was able to calculate the amount of blood going through the lungs in that time, and from this the amount of blood—about 4 quarts—put out by the heart every minute.

A SMALL herd of wild horses, the last reminders of the days many centuries ago when western Germany was a "Wild West," are now carefully watched and tended on a ducal estate in Westphalia. They range in the Merfeld fens, near Dülmen, which are the property of the Duke of Croy. The animals are kept in a large fenced area and left practically to themselves, unshod and without stables or any kind of shelter. They are rather small, tending to the pony type. There are still some 130 head of them; the surplus, about 20 young stallions yearly, are sold.

THE health of a Diesel engine is now determined by taking its temperature. A thermometer in the exhaust of these oil-burning, internal combustion engines, which are increasing rapidly in popularity, can be relied upon to show how combustion is proceeding in the cylinders, says a recent issue of *Power.* Curves have been drawn to give operators the correct value of temperature for different loads. For example, the exhaust temperature of the four-stroke cycle, air-injection Diesel is directly proportional to the load, the points for the curve forming a straight line. Its full load temperature is 700 degrees Fahrenheit. Apparently most types of Diesels have a no-load exhaust temperature of about 230 degrees.

ICE on airplane wings, the cause of many accidents in the past, may lose much of its terror with the aid of a new warning device developed by the Bureau of Standards. It does not prevent the formation of ice, but gives the pilot warning, by the shining of a red light on his instrument board, when conditions are such that ice is likely to form. Then he can take proper precautions, either landing or going into a warmer layer of air. Experiments have shown that ice forms at temperatures between 26 and 32 degrees Fahrenheit, when the airplane is flying in air that is saturated with water vapor. The instrument consists of a temperature-actuated switch, operating on a battery of pocket flashlight cells. When the dangerous temperatures are reached, the red light flashes. If it is cold and dry, the pilot can either ignore its warning or switch it off, for then there is no danger, even at the low temperatures.