SCIENCE NEWS

Science Service, Washington, D. C.

ALUM SOLUTION SPRAYED IN NOSTRILS INCREASES ABILITY OF MONKEYS TO SURVIVE INFANTILE PARALYSIS

THAT the use of nasal spray containing a weak solution of alum has been found to increase markedly the ability to survive infantile paralysis is indicated by experiments with monkeys reported by Drs. Charles Armstrong and W. T. Harrison, of the National Institute of Health in Washington, D. C.

Seventy-four per cent. of the monkeys treated with the solution survived injections of infantile paralysis virus. Only 16 per cent. of the untreated control animals survived the same injections. This is a survival ratio of four to one. "In addition to their higher survival rate the alum-prepared animals which developed poliomyelitis (infantile paralysis) tended to develop the disease later and the ailment ran a much slower course than was the case for the control groups."

The average interval from the first virus inoculation to complete paralysis for the alum-prepared group and the control group, respectively, was fourteen and two thirds days and nine and four fifths days. All alum-treated monkeys which became paralyzed recovered completely except one. The three sole survivors of the control group were completely paralyzed after the disease had run its course.

Cautiously, Drs. Armstrong and Harrison are not yet ready to recommend the simple treatment for human beings. They say: "The results here reported are not recommended for human use, but offer a hopeful avenue of approach which may lead to effective methods against poliomyelitis and possibly against other diseases contracted by way of the nasal mucous membranes." They have tried the alum treatment on themselves and find it produces a temporary tickling and stinging which causes an occasional sneeze. There is an increased nasal secretion for about an hour and then a feeling of dryness which disappeared after several hours.

How the alum solution helps to protect against infantile paralysis is not exactly known. Tests undertaken to show whether specific immunity was developed in the animals by the alum treatment indicate that no obvious increase in immunity was apparent. "The protective action of the alum solution is believed," Drs. Armstrong and Harrison conclude, "to be due to an alteration which decreases the permeability of the mucous membrane of the nose rather than to an antiseptic action."

THE EFFECTS OF RADIUM ON CELLS

THE effects of radium on living cells are always in the direction of breakdown and death; its powerful radiations, principally of alpha particles, never act to stimulate more rapid growth. These are the conclusions reached by Professor Frederick B. Flinn, of the College of Physicians and Surgeons of Columbia University, as the result of experiments on tissue cultures from living embryo chick hearts, checked up with other animal cells and with one species of primitive one-celled plants.

Professor Flinn's interest was aroused by the tragic fate of a number of women workers on radium-illuminated watch faces, who suffered breakdown of their bones, particularly of their jaws, from the effects of radium unwittingly taken into their systems. In his researches, he used chick heart tissues, cultured in the way developed many years ago by Dr. Alexis Carrel, of the Rockefeller Institute for Medical Research. Each culture was divided into two halves, one of which was treated with radium in various degrees of intensity, while the other part was kept untreated as a check or "control." The type of tissue chosen was that most nearly resembling the fibroid or cancerous growths that have replaced healthy bone in the patients.

In no case was it found that a radioactive solution, even the weakest, was stimulative of extra growth. Any concentration of radium strong enough to have any effect at all had a slowing-down effect, and above a certain minimum strength they eventually killed the tissues exposed to them.

Dr. Flinn was therefore brought to the conclusion that the replacement of radium-destroyed bone by malignant fibroid tissue was due first to the destruction of the bone-repairing cells, which permitted the decay of the bone and its subsequent failure to re-form even when extra calcium is medicinally administered, followed by the abnormal tissue growth, and frequently by bacterial infection, as the result of the constant irritation which is known to occur at sites of fracture and of greatest bone stress.

MULTIPLE LIGHTNING STROKES

DESTRUCTIVE lightning strokes which shatter a tree or telephone pole, burst a block of concrete through which a wire runs or dig a hole in the ground are the result of too much confinement, according to a report made by P. L. Bellaschi, engineer of laboratories of the Westinghouse Electric and Manufacturing Co., at Sharon, Pa. If the core of the lightning stroke is confined within a bore having a diameter less than about eight tenths of an inch, internal pressures may be built up of anywhere between ten to twenty thousand pounds to the square inch. Few natural materials will stand such forces and naturally blow up.

Mr. Bellaschi will report in a paper to be delivered at the forthcoming meeting of the American Institute of Electrical Engineers in Seattle, Wash., that electrical engineers were led to investigate the shattering of wires by lightning strokes because of the paradox that small wires were known to be able to withstand high currents comparable with those of lightning and yet were sometimes fused and destroyed by lightning. The secret appears to be that many lightning strokes are not single discharges, but multiple ones. Lightning, in other words, sometimes strikes anywhere from five to ten times in the same place within a fraction of a second.

From a collection of experimental data gathered in a study of lightning with a super-speed camera it was found that 80 per cent. of the lightning strokes were single ones. The other 20 per cent. were of a multiple nature. The multiple flashes are suspected of being the ones which crush large hollow cylinders, fuse telephone wires and other heavy-current carrying electrical leads.

Laboratory tests showed that very heavy lightning strokes, having currents up to 200,000 amperes, would be needed to destroy conducting equipment in the manner authentically reported. The cumulative effect of several more moderate strokes coming one on top of the other is believed to explain the lightning paradox.

THE LARGEST SODIUM LIGHTING SYSTEM

THE largest installation of sodium vapor lighting in the world will be installed on the new San Francisco-Oakland Bay Bridge. More than 35 full moons would have to shine simultaneously to give the same average intensity of light on the upper roadways of the bridge, which will be reserved for passenger high-speed vehicles. The General Electric engineers who designed them claim that the golden yellow light of the sodium units has the greatest optical efficiency of any lighting system in existence. Small objects can be seen at low intensities with greater ease under the soft, diffused light of the sodium lamps than under any other kind, tests indicate, and at the same time they are far more economical than ordinary lights.

The 10,000 lumen lamps used on the upper level of the bridge will produce approximately two-and-a-half times as much light as ordinary lights of the same energy consumption. On the lower deck the 6,000 lumen units which will be installed to light the way for trucks and slower traffic will produce twice as much light as that obtained from incandescent bulbs of the same energy consumption. Lamps adding up to 6,720,000 lumens will be installed on the upper deck, and 1,500,000 lumens on the lower deck, making a grand total of 8,200,000 lumens for the entire bridge, the largest single order ever placed for sodium lights.

The new golden sodium lamps giving out 10,000 lumens require an energy in-put of only 220 watts, of which 185 watts or less goes to the lamp, the rest being used by transformers and other equipment. In comparison, ordinary incandescent lamps would require approximately 550 watts to produce 10,000 lumens. Consisting of a special sodium-resistant glass, the bulb of the 10,000 lumen sodium lamp contains a small quantity of sodium and some neon gas. When the lamp is cold, the first application of the current causes the neon gas in the lamp to glow brilliantly with its characteristic red color. Thirty minutes is needed to store up enough heat to vaporize the sodium fully and cause the lamp to shed its characteristic orange-yellow light.

THE BENDING OF THE EARTH'S CRUST DUE TO BOULDER DAM CONSTRUCTION

MAN at last has a chance to determine if the earth's crust—from 17 to 75 miles thick—will bend under a great weight. Theory says it will, but until the construction of Boulder Dam no way seemed possible to prove the answer.

The U. S. Coast and Geodetic Survey is planning to make accurate surveys of the region around Boulder Dam to see if the weight of the dam and the huge lake it will store up are sufficient to compress the underlying rock of the great continental shields. The estimated weight of the lake alone is placed at 41,500,000,000 tons. Never before has man placed such an enormous weight on one spot of the earth's crust.

Theory says the solid layers on the outside of the earth really float on a much heavier material which lies below in a plastic state. The condition is much like a woven raft of logs afloat on a lake. If a heavy weight is placed on such a raft it submerges partially. It is thought that the weight of mountains similarly submerges the bottom of the solid crust into the underlying plastic material.

Behind the plans of the Coast and Geodetic Survey is the thought that an additional increase in weight at one spot will further sink the floating crust until equilibrium is established. Engineers expect that the elastic compression of the rock in the earth's crust will cause an area of twelve square miles to sink six tenths of a foot in from two to three years.

The sinking of the solid crust into the plastic matter beneath may cause an additional two foot drop over an area of 150 square miles. How long this lowering will need to occur is not known. Eventually, however, bench marks soon to be established well tell the story.

GIANT TURTLE AND MOSASAUR FOUND IN ALABAMA

GIANTS that were deadly enemies in the warm seas of the world 70,000,000 years or so ago have been found as fossil skeletons in the rocks of Alabama by Dr. Walter B. Jones, state geologist and director of the Alabama Museum of Natural History.

They were a tremendous sea turtle, whose bones still bear the marks of an enemy's teeth, and a mosasaur. Mosasaurs were kin-beasts of the great dinosaurs that ruled the land, and they were themselves no less the tyrants of the sea. They were huge, short-necked, paddle-limbed reptiles, with powerful jaws like crocodiles and long, snaky, flat-tailed bodies built for speed and maneuverability in the water. The tooth-marks on the turtle's bones were doubtless inflicted by a mosasaur, which either caught and slew the turtle or found and devoured its body after death in some other manner.

Discovery of the fossil remains of these two sea giants in what has long been solid land in Alabama shows how far the sea transgressed the Gulf slopes of America during the Cretaceous, or Great Chalk Age, when they were living. The wide central valley of this continent has been invaded by the sea many times during the long ages of geology, and the records of these millions of years of ebb and flow are written in the sedementary rocks. Both skeletons were in a more or less broken-up condition when found, but the pieces have been carefully cleaned and fitted together, and are now on display at the museum.

MOCKINGBIRDS FIGHT TO DEFEND THEIR TERRITORIES

MOCKINGBIRDS, like most songbirds, recognize definite property rights, and will fight vigorously to defend them. Mockingbird landholding customs have been carefully studied by Harold Michener and Josephine R. Michener, of Pasadena, who present a detailed report in the current issue of *Condor*, journal devoted to observations and researches on birds of the West.

When a male mockingbird in spring finds a suitable place for bringing up a family, he posts himself at a prominent point and by loud singing notifies all comers that he has staked his claim. Would-be claim-jumpers of his own sex are promptly attacked and routed. When he is joined by a female and takes her for his mate, the territory he has chosen becomes the source of the family food supply for that breeding season. The male continues to defend it, the female taking no part in his fights in defense of the home territory, but devoting herself to her maternal affairs.

But after the young ones are raised and the nest abandoned, both birds select a winter feeding territory, which often includes the nesting area, but usually has wider boundaries. This they defend together, the lady being no less pugnacious than her mate if an intruder tries to forage in it. Boundaries, once established, are usually recognized by the birds on both sides of them; though some individuals are less careful about respecting their neighbor's property rights than are others, and have to be chased home frequently.

ITEMS

DROUGHT is edging into the national weather picture again, despite the heavy drenching the soil got over the whole country during the spring. U. S. Weather Bureau reports indicate the beginnings of a serious lack of moisture in wide areas in the grain-growing sections. "Much of the Midwest experienced another unfavorable week through a continuation of abnormal heat and scanty precipitation," according to *The Weekly Weather and Crop Bulletin*. "Some areas received timely and beneficial rains, but over the greater portion of the country, between the Mississippi River and the Rocky Mountains, moisture is badly needed, as rainfall for many weeks has been scanty.

THE earthquake that caused destruction and death in the Colombian city of Pasto and in neighboring towns, on the morning of August 7, had its center almost on the equator, near the Colombia-Ecuador boundary, U. S. Coast and Geodetic Survey seismologists announced after examining data transmitted through Science Service by a number of observatories. The location of the epicenter was given provisionally as one degree north latitude, 78 degrees west longitude. Time of origin was 4: 02 A. M., Eastern Standard Time.

VENUS, the brilliant "evening star" that has been shining in the west just after sunset during the spring and early summer, will soon be gone from the evening sky, but another planet, Saturn, is appearing in the east to take its place. In the meantime, Jupiter still shines brilliantly, though inferior to Venus, in the southwest, and to its right is Mars, identified by its red color. On September 8, Venus will be in the same direction as the sun, and now, as it rapidly draws into that position, it is setting sooner and sooner after sunset. By the end of August it will be gone before the sky is dark enough to show it. By the end of September, however, it will move to the western side of the sun and then, rising before sunrise, will be a brilliant "morning star."

A METHOD of taking portrait-pictures by x-ray, pictures which show the fleshy part of the face as well as the bones underneath, has been developed by Dr. W. Teschendorf, roentgenologist of Cologne. X-rays have the power to pass through the flesh of the body but are stopped by the bones, which consequently appear as shadows in an ordinary x-ray picture. When a physician wants to see other, non-bony parts of the body, such as the digestive tract, he gives the patient a drink containing a substance that will stop the x-rays, generally a bismuth mixture. Dr. Teschendorf has made up a fluid capable of stopping x-rays which he sprays on the face before taking an x-ray portrait. This enables him to take a picture of the flesh and bones of the face at the same time. The fluid washes off easily after the x-ray portrait has been taken.

PILOTLESS, full-sized and radio-controlled airplanes capable of exceeding 100 miles an hour and reaching altitudes as high as 10,000 feet have been developed for anti-aircraft target practise by the British Air Ministry. The robot planes have the flight characteristics of the familiar Tiger and Moth types. Equipped with 130 horsepower motors, they can take off either from an airport or by catapult from an airplane carrier at sea. In flight the planes sweep in great circles, with a maximum radius of ten miles, at all times under radio control from staff officers on the ground.

PACIFIC OCEAN bottom rock is different from rocks found anywhere else, whether on land or under other oceans. It appears to be the earth's real foundation rock, overlaid elsewhere with other deposits which are missing throughout the area of the world's greatest ocean. These are conclusions reached by Dr. B. Gutenberg, of the California Institute of Technology, as a result of a long study of the rate at which earthquake and explosion waves travel through the earth's crust in various regions. The denser the rock the more rapidly the waves travel. Everywhere except in the Pacific region the slower rate of rock wave movement indicates the presence of a "continental layer," says Dr. Gutenberg. This continental layer consists of two parts: an upper set of strata composed of sandstones, limestones and other sedimentary rocks; and a lower, thicker section made up of denser crystalline rocks like granite and basalt. Beneath this continental layer lies the real "rock bottom" of the earth's crust, called the "sial" by students of earth structure, made up of rocks of the class known as peridotites.