SCIENCE NEWS

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INFLUENZA VACCINE

THE first extensive human trials of a vaccine against influenza developed in the Rockefeller Foundation's International Health Division laboratories are being conducted in Puerto Rico during the epidemic now subsiding there. Volunteers are being given the injections which it is hoped will protect against the disease. Made from the virus grown upon chick embryos, the vaccine is administered by injecting under the skin. The extensive epidemic of influenza in Puerto Rico presented the first real opportunity of testing the Rockefeller vaccine.

Any doubt that the Puerto Rico outbreak is real influenza was dissipated when field investigations demonstrated that the virus of this outbreak is the same as that identified by the group of British investigators who first isolated the influenza virus—Drs. W. Smith, C. H. Andrewes and P. P. Laidlaw.

An intensive investigational attack is being made upon the Puerto Rico outbreak by the Rockefeller Institute, cooperating with other investigators. Dr. Edwin H. Lennette and Dr. E. R. Richard, of the laboratories of the Rockefeller International Health Board in New York, went to the scene of the outbreak. There they are working closely with Dr. John W. Oliphant, of the U. S. Public Health Service, who was sent from Washington. Dr. P. J. Crawford and Dr. H. P. Carr, of the Rockefeller Institute, who are regularly stationed at Havana, are also working on the influenza situation in the West Indies.

In the New York laboratories of the International Health Board of the institute, Dr. F. L. Horsfall, Jr., is carrying on laboratory researches on material sent from Puerto Rico and continuing with his colleagues the intensive investigation of the disease.

Predictions about the further course of the epidemic now subsiding in Puerto Rico are hazardous, but authorities are apprehensive that the disease may spread to the mainland of the United States.

The epidemic is reported to have reached St. Thomas, Virgin Islands, on July 19, Cuba on August 2 and the Dominican Republic on August 7. Since medical science is very much in the dark about just how the disease is spread, no effective steps can be taken to prevent its transmission to other parts of the western hemisphere. Probably it can be transmitted by those who are only slightly ill or harboring the virus while well. The complete stoppage of all travel from boat, airplane or any other means would be necessary for any effective barrier, and this is impracticable.

Whether the epidemic will reach the United States and whether it will become serious in proportions can not now be predicted. The investigators are anxious that the public shall not become alarmed at any such prospect. The historical record does show that some of the influenza epidemics of the past have had their origin in the Caribbean region. The outbreak of 1934 was one of these.

If influenza does strike the United States the epidemic is not expected to be on the order of the famous one of 1918. About 3 per cent. of the people of Puerto Rico were ill in the present outbreak, but only about a third of one per cent. of those taken ill died.—WATSON DAVIS.

THE DEATH RATE OF CHILDREN

ABOUT three out of every four children born now will die from chronic disease, while acute disease will take about one in six, according to a bulletin issued by the statistical department of the Metropolitan Life Insurance Company. This represents a considerable change from conditions at the beginning of the century. Every third child born then would have been killed by acute disease, while chronic disease would have been responsible for the deaths of about half the group.

Childhood ages have chiefly benefited by the cut in death rate from acute and infectious diseases. On the other hand, most of the chronic diseases, which have their greatest incidence in mid-life and in old age, have shown little or no improvement, and in some cases there have been actual increases in their mortality rates. Of the chronic diseases, tuberculosis is the only one of importance that has shown any marked improvement.

The data also bring out the fact that "external causes," which include deaths by suicide, homicide and accident, have greatly increased in importance since 1920, especially for males. In 1901 77 in a thousand males would have died in this way, in 1920 this had increased to 79, but in 1937 it stood at 101. The corresponding figures for females were 33, 38 and 56 in a thousand. Other figures collected, comparing deaths during the first half of 1939 and of 1940, show that the depression years did not adversely affect the health of the nation.

Early in the thirties, it is stated, "it was feared that the most severe industrial depression of a generation would be quickly reflected in an increased death rate. When this did not happen and when indeed each year, without exception, registered a more favorable mortality rate than had prevailed in any year during the '20's,' many health workers still feared that the ill effects on the public health were merely postponed, and that a rise in the death rate would come well before the close of the '30's.' This, again, did not happen, and the record new low rate of the current year, to date, is incontrovertible evidence that these fears were idle and may now be entirely dismissed."

The death rate per thousand, for those insured in the industrial department, was 8.98 in the first six months of 1939 and 8.14 in 1940.

THE ICE AGE

SOME 200,000,000 years ago the earth had a second moon, which broke into pieces. These formed a ring around our planet, like that now around Saturn. This shaded the equatorial regions of earth, cooling them sufficiently to cause tropical glaciers, in which ice flowed toward the poles. Such, in brief, is the theory proposed by Ronald L. Ives to explain the large areas of ice which, geologists have found, covered large areas in the tropics

during the Permian period. This lasted for about 30,000,000 years, ending around 190,000,000 years ago. The Ives theory is explained in a paper in the current issue of the *Journal* of the Franklin Institute.

Records have been found of four different ice ages, and three of them can be explained by a general cooling of the earth's surface. Such cooling has been caused, it is suggested, by increased volcanic activity, which threw large quantities of dust high into the atmosphere, where it screened the sun's rays from the earth as a whole. With world-wide temperatures reduced, the ice from the polar regions extended nearer to the tropics.

But evidence for glaciation in the Permian period has been found in and near the tropics, particularly India, central and South Africa, Australia and South America. There is also evidence that the ice at this time flowed away from the equator rather than toward it. To explain this geological mystery, Mr. Ives proposes that the earth once had a second moon, which he calls "Ephemeron." This, he thinks, was much smaller and nearer than the present moon, and revolved, approximately, over the equator. It may have been a minor planet, "captured" as it happened to approach the earth's gravitational field. Then, like the inner moon of Mars, it may have traveled around even faster than the planet revolved. Under these conditions, the same forces that cause tides would have pulled it nearer to earth.

Finally it would have come within about 12,000 miles, the "Roche limit"; it was so close that the tidal forces of the earth on Ephemeron would have shattered it into small pieces. These would continue to revolve around the earth, giving us a ring like that of Saturn's, which, it is supposed, had a similar origin. At last the ring would disintegrate. Continuing tidal action, as well as collisions of the pieces with each other, would gradually pull them down, causing a continual rain of particles into the atmosphere. "This, during nights in the early Permian, must have produced extremely spectacular meteoric effects, resembling a rain of fire in the upper atmosphere over the equatorial regions."

In the unknown period of time while the ring was in existence, it would have partially shaded from the sun's rays what are now the tropics, cooling them to such a low temperature that ice would have covered large areas. What are now the temperate regions would have been warmer, on the average, and the ice would have tended to flow in those directions.

As a test of his theory, Mr. Ives suggests that careful watch be kept of the rings of Saturn, which may be found gradually diminishing in size, then disappearing. It is also possible, he says, that Phobos, the inner moon of Mars, and the innermost one of Jupiter, may be eventually turned into rings.

"In the very distant future," he says, "as (and if) the solar system 'runs down,' earth may capture some wandering mass of cosmic junk and again acquire a ring like that postulated to explain the Permian glaciations. Speculation concerning the time of capture of this as yet unknown body is futile, for exact data, or even sufficiently detailed hypotheses, upon which to base the reasoning, are not now in existence. According to a number of theories, notably those of Jeffreys and Darwin, the moon will ultimately be drawn toward earth by tidal forces, and upon reaching the Roche limit will be broken up, the fragments forming a ring of small satellites about earth. This ring will probably produce such changes on earth that life in forms resembling the present will be impossible. Calculations suggest that this cataclysm will take place in about eight billion years, an interval about three times that from the 'creation' to the present."

SUBMARINE CANYONS

THAT reversible currents, changing direction every few hours, sweep in and out of deep submarine canyons off the southern California coast, has been discovered by Professor Francis P. Shepard, the University of Illinois geologist now working at the Scripps Institution of Oceanography at La Jolla. These currents apparently do something to keep the canyons from filling up with sand and silt, but they are not strong enough to account for the cutting of the canyons themselves.

Cause of the currents is still undetermined. They can hardly be tidal phenomena, for they reverse direction in anything from one to four hours, which has no discernible relation to tidal periodicity. Professor Shepard conjectures that they may result from great oceanic eddies.

The canyon floors have been found to be practically free from mud where the canyon heads extend into the coast or near to the coast. On the other hand, muddy sediments at least ten feet in thickness have been discovered in canyons which terminate at a distance of a mile or more from the shore. This may indicate that the currents, weak as they are, are effective in the case of canyons which approach the coast. More likely, however, landslides along these canyons produce the effects.

The origin of these submarine canyons continues to be a puzzle. They have the same shape and arrangement as canyons cut by rivers on land. Rounded gravel has been dredged up out of some of them, to depths as great as 3,000 feet. This again suggests river action, for it is hardly likely that wave action would shape stones into rounded forms at that depth. Finally, some of the canyons have deltas, like those formed by rivers, at their outer ends.

The great depth at which some of the canyons have been found is one obstacle to ready acceptance of the theory of their formation by rivers on land and subsequent drowning in the sea. Regarding this, Professor Shepard says: "It is interesting to note that canyons are found off all sorts of coast quite regardless of the type of rock, of the violence of storms, the width of continental shelf, etc. Nor do they show any relation to areas where the coasts are known to be unstable. This suggests but by no means proves that the sea level has been changing. However, the canyons extend so deep that it seems certain that if they are river-cut there must have been more than sea-level changes to account for them. My guess at present is that there has been a combination of processes of which sea-level change due to much larger polar ice caps than have been normally supposed is the major contributing factor. Sea-level

changes of 2,000 to 3,000 feet may set up great strains in the earth's crust due to redistribution of weight, and these strains may have caused emergence of the continental borders to a considerable degree. However, other factors no doubt combined to produce the curious submarine features.''

REPRODUCTION OF THE GLOSSY FINISH OF PERSIAN CRAFTSMEN

A GLOSSY finish that was the pride of Persian craftsmen 2,500 years ago has been restored to a plaster cast of an ancient lion's head sculpture by a few minutes of photographic ''developing'' at the University of Chicago. The process was used by Herbert P. Burtch, of the Oriental Institute.

The institute received from its Persepolis expedition fragmentary stone scraps of lions' heads. Pieced together, the fragments formed a magnificent snarling head in a plaster cast, but the cast was a dull, light color, instead of the original shining black of the effigy in ancient Persia.

Confronted with the problem of restoring the original gleam to the head, Mr. Burtch, after some experiments, hit upon the photographic process. The plaster cast was treated with silver nitrate, applied with a brush. Then it was ''exposed'' like a photographic plate or film, under a strong, even light.

The ''bathing'' process presented a difficulty, since the surface could not be touched without spoiling the appearance, but it was necessary to slosh the cast in water. A set of clamps and a metal standard provided the necessary purchase, but it took two men to ''bathe'' the head. Application of developer with a brush was the final step, and the product was a hard, glossy black, as pleasing as the stone original seen by the Persians two and one-half millenniums ago.

ITEMS

QUARANTINED at the National Zoological Park in Washington are beasts and birds which were brought back from Liberia by Dr. and Mrs. William M. Mann, who have been collecting new inhabitants for the Washington zoo during a several months' sojourn on the Firestone plantations in Liberia, with trips up country into the bush. Among the creatures in the fifty-odd crates brought ashore at the Army Base at Norfolk, Va., when the Barbour Line steamer *West Irmo* docked, are a pigmy hippopotamus, several chevrotain (miniature deer) and duiker (rabbit-sized antelopes), a number of monkey-eating eagles and a considerable miscellany of small mammals, birds and reptiles. The hoofed animals must be kept in quarantine for fifteen days because of the danger that they might introduce hoof-and-mouth disease, and all birds of the parrot family have to be kept under strict observation until they are proved free of parrot fever.

A GROUP of about fifteen amateur astronomers, members of the Amateur Astronomers Association, which has headquarters at the Hayden Planetarium in New York, will travel to Brazil to observe the total eclipse of the sun on October 1, according to an announcement made by Charles A. Federer, Jr., secretary of the association and editor of the magazine *Sky*, who will lead the party. The expedition will make observations from Campina Grande, at an altitude of 2,000 feet on the Borborema Plateau, and about 80 miles northwest of the city of Recife (formerly Pernambuco). Since the region is known for its long droughts, and September and October are excessively dry, there seems to be slight possibility of clouds interfering. Amateurs from other societies and their friends are invited to join the expedition and to participate in the program. George V. Plachy, chairman of the Committee on Special Events, is in charge of the detailed plans.

DISCOVERY of a new object that is probably a super nova, a vast stellar explosion, has been made by Dr. Josef J. Johnson, of the California Institute of Technology, with the 18-inch Schmidt telescope at the Observatory on Mt. Palomar. It occurred in a distant galaxy of stars, near the bowl of the Great Dipper in the northern sky. This is so faint that it is known only by its catalogue number, NGC 4545, and it is so distant that its light takes millions of years to reach us. Photographs taken at the end of July showed the object to be of the fifteenth magnitude, much too faint to be seen without a powerful telescope. A plate taken about two weeks earlier showed no trace of the explosion, though it would have been recorded had it been as bright as magnitude 17.5.

A NEW and cheaper method used in the search for trees afflicted with Dutch elm disease is described by W. E. Ahrens, of the U. S. Department of Agriculture, in the forthcoming issue of *Phytopathology*. It has the further advantage of being usable at any time of year, instead of only when the trees are in leaf, as at present. Mr. Ahrens's method depends on the fact that Dutch elm disease causes a marked discoloration of considerable areas in the sapwood, just beneath the bark. Samples of this wood, to a depth of from two to five annual rings, are obtained by driving in a half-inch hollow punch at six-inch intervals all around the trunk. The small wounds thus made are protected against other infections by squirting in a little paint, from a pump-type oilcan. The thin disks of wood are clipped in two, and if any of them show the discoloration symptom they are taken to the laboratory, where cultures show if the fungus is present.

A PROTEIN-DIGESTING enzyme, resembling pepsin in its action, has been found in the troublesome weed known as horse nettle or bull nettle by Dr. Davis M. Greenberg and Theodore Winnick, of the University of California. It is even more like the digestive compound found in the subtropical fruit papaya, known as papain, and because the weed's generic name is Solanum, the newly discovered substance has been given an analogous name, solanain. Papain has long been used as a medicine for indigestion, and it is regarded as possible that solanain may prove useful in the same way. It may also find economic application in tanning and other industries.