SCIENCE NEWS

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A NEW GERMICIDE

A LIQUID germicide, known as S. T. 37, that destroys bacteria so quickly that the time in which the reaction occurs can not be accurately measured, has been developed by Dr. Veader Leonard, assisted by Dr. William A. Feirer, of the Johns Hopkins School of Hygiene and Public Health.

The new germicide has the selective capacity of killing even the most resistant bacteria in fifteen seconds without injuring the most delicate tissues. The active agent responsible for this extraordinary germicidal power is hexylresorcinol, a synthetic chemical harmless to man but possessing over 70 times the germ-killing power of pure carbolic acid.

Hexylresorcinol was first developed in the Hopkins laboratories about three years ago. Since that time it has come into general use by the medical profession both here and abroad as an internal antiseptic. Dr. Leonard has continued his search, however, to find a way of "harnessing" his new compound so that it could be put to use as a general antiseptic.

After many experiments a solvent consisting of glycerine diluted with water was found that seems to answer all practical purposes. Dr. Leonard's research has thrown a great deal of light on the explanation of the great speed and efficiency of the hexylresorcinol's germicidal action.

"All fluids," he explained, "are endowed with a physical property known as 'surface tension.' This cohesive force, which can be measured accurately in tiny units known as dynes, is the force which makes a fluid like pure water draw itself up into small separate drops on surfaces such as a window pane, instead of flowing out over the surface of the glass in a thin film. Pure water has a very high surface tension—namely, 77 dynes, and for this reason will not penetrate into tiny spaces into which fluids of low surface tension will readily flow. Now hexylresorcinol is so incorporated in solution S. T. 37 that the lowest possible surface tension is maintained—it amounts to only 37 dynes—a fact from which the name S. T. 37 is derived. Being largely freed of this 'self-contracting' force, the solution is very penetrating. This allows the solution to come into contact with germs which may be lurking in the depths of tiny microscopic crevices—and which would otherwise escape destruction.

"Contact with the bacteria having been made, by means of this penetrating property, the same factor, low surface tension, now operates in two ways to speed up the destruction of the germ. In the first place, chemicals like hexylresorcinol, which lower the surface tension of their solutions very powerfully are known to concentrate themselves very rapidly on the surface of any tiny non-crystalline particles with which the solution comes in contact. This phenomenon is known to the physicists as mechanical adsorption and hexylresorcinol shows it in high degree. Now it so happens that germs are non-crystalline particles and when brought in contact with S. T. 37 the hexylresorcinol immediately becomes concentrated on the surface of these germs. The agent which destroys them actually seeks them out and 'pounces' on them, so to speak."

EARTHQUAKE WARNINGS

EARTHQUAKES of the future may be heralded by the ringing of an earthquake alarm bell a few hours before the shock. In this way there would be time for an exodus from tall buildings and other places where the greatest loss of life is likely to occur.

That such an earthquake warning is not at all impossible is the statement made by John W. Evans, British seismologist, in a letter to *Nature*. Investigations made by Professor Akitune Imamura, the leading Japanese earthquake expert, and presented by him at the recent Geodetic and Geophysical Union meeting in Prague, support his ideas.

The effect that Mr. Evans proposes to utilize is that of a tilting of the earth's surface which seems to happen usually a little while before a quake. In five Japanese earthquakes between 1793 and 1927, including the great quake in 1922, there was a lifting of the ground of a yard or two which preceded the quake by from half an hour to five hours.

By means of an instrument developed by another Japanese scientist, Ishimoto, a very slight tilting of the earth can be measured. So sensitive is this climograph, as the instrument is called, that it will detect a tilting of the earth so slight as to move a pole a mile high only a fiftieth of an inch at its top. With an earthquake that occurred in Japan last spring, said Professor Imamura, as quoted by Mr. Evans, this instrument showed a characteristic tilting which appeared from a few weeks to the day before the quake. About two and a half hours before the shock there was a rising of the ground of about a meter.

Mr. Evans suggests a chain of such stations for warning. "It would seem desirable," he says, "in regions subject to serious earthquakes, a number of local stations should each be equipped with a pair of simple horizontal pendulums, so adjusted that if any unusual tilt occurs a bell should ring automatically in the office of a central observer and the locality indicated there by a signal. He would then judge from the number of stations affected and the record of his own seismometer, whether the indications were sufficient to warrant him in giving the alarm.

PROPOSED RUSSIAN GEOLOGICAL SURVEY

THE Soviet republics of Russia are at last making practical attempts to utilize the vast mineral resources of the country. Professor D. J. Mushketov, director of the Geological Institute of Leningrad, has just completed

a two months' visit to the United States, studying the administration of both the U. S. Geological Survey and the various state surveys, with the view of introducing a similar system in Russia.

The United States is the only country in which geology is an organized science, where geological problems approach those of Russia in magnitude or variety. For this reason he has been giving careful attention to the way in which geological departments in the different parts of the country are coordinated. Heretofore all the geological work in Russia has been done under the institute of which Professor Mushketov is director, but the country is so huge that such centralization is obviously inadequate.

In spite of the fact that the financial appropriation for geological investigations is 20 times what it was before the war, lack of funds is the chief obstacle in the way of the development of Russia's immense mineral resources. About 80 per cent. of all prospecting for mineral deposits is undertaken under the direction of the state geological institutions rather than by private companies.

Recent discoveries of potash made by the Geological Institute have rendered the Soviet republics independent of Germany in supplying their needs of this important chemical. Two strikes, one near Beresniki on the River Kame, and the other on the Soeikamsk, have uncovered a reserve of potash that is believed to be more than twice as great as that of Germany. The first mine will probably be operated by the government, but the others will probably be given to private concessions for export purposes.

New oil fields discovered in the Emba district on the north shore of the Caspian Sea, and others in Asia, promise to add materially to petroleum production.

Professor Mushketov has been especially interested in work done on geophysics in America particularly in the practical application of geophysical methods to such problems as prospecting for oil, water and ore deposits and the study of earthquakes and landslides.

TULAREMIA

Now that the season for rabbits has opened again, the American Public Health Association has issued a warning against tularemia, the rabbit disease that is sometimes transmitted to human beings.

Human cases of this disease, which gains access by means of breaks in the skin or bites from flies or ticks, have been found in nearly every state in the union. The New England States, New York, New Jersey and Delaware, are the only localities which the disease has not yet invaded. In man it is characterized by swelling of the lymph nodes, fever and slow convalescence with disablement for many weeks or even months.

Any workers in an occupation in which rabbits are skinned, dressed or cut up are especially liable to the infection. Ticks and flies found on horses, cows and sheep may also carry it. Even when frozen, diseased rabbits remain infective for three weeks, but are safe after four weeks. About ten per cent. of the rabbits on the market are infected, according to officials of the U. S. Public Health Service who are studying the disease, but those which have been thoroughly cooked are safe to eat. Workers who have occasion to handle the infected animals are advised to wear rubber gloves. The eradication of the ticks, flies and rabbits that carry the disease is practically impossible. Ticks remain infected for life and are able to transmit the infection through their eggs to the next generation. No preventive vaccine or curative serum has been perfected and no drug has any special value in treating the disease.

SERUM TREATMENT FOR MUSHROOM POISONING

WHAT appears to be a successful serum for mushroom poisoning has been developed by Dr. Dujarric de la Riviere, professor at the Pasteur Institute in Paris, according to a report just made to the American Medical Association by its French correspondent.

The French doctor prepared his serum by inoculating a horse with increasing doses of four highly toxic mushrooms and then used it to treat laboratory animals, obtaining highly successful results.

When called to the assistance of a family in which three people had been poisoned at the same time, it happened that he was able to secure only two ampoules of the serum from the Pasteur Institute. These he administered to the two patients who appeared to be most seriously stricken, with the result that the two who received the serum injections recovered while the one who did not died.

When a report of his research was presented to the Congress of Hygiene, that body passed a resolution recommending that supplies of the new serum be kept in hospitals and so far as possible in the town halls of villages for the accommodation of physicians.

THE ORIGIN OF CLOTHES

PRIMITIVE man and his wife first took to wearing clothes in order to keep off stinging flies, sharp-billed mosquitoes, cooties, fleas and other lively pests. This simple answer to the puzzle problem: "How did we come to wear clothes, anyway?" is advanced by Dr. Knight Dunlap, professor of psychology at Johns Hopkins University.

"Crawling and flying pests are with primitive man abundantly and very intimately," Dr. Dunlap points out, in a paper to appear in the first issue of a new scientific publication, *The Journal of General Psychology*.

Skins or cloth might be wrapped tight around the body for protection against stings and bites, but this is confining and in warm climates impossible.

"Much more efficient protection is afforded by hanging strings, leaves, strips of hide, animals' tails and similar articles so that they will flap with the movements of the wearer," he says. "In other words, the best fly chasers are exactly the garments most characteristic of savages and primitive man. These afford protection without undue warmth or exclusion of ventilation.

"The fly protections we have customarily used on our domestic animals are exactly of the types of primitive human clothing which have baffled the early anthropologists."

Ornaments such as nose rings, leg bands of fur, peculiar haircuts and designs tatooed in the skin were originally badges of identity, Dr. Dunlap concludes. Ornaments were, and still often are, worn to distinguish an individual as a member of a certain tribe. To the initiated, such regalia show whether the wearer is a married man or a bachelor, how many men he has killed in battle and how many cows he owns.

There have been but four theories of the origin of clothing. These are: First, the modesty theory (covering up the body); second, the immodesty theory (making the body mysterious and alluring); third, the adornment theory, and fourth, the utility or protection theory, with which Dr. Dunlap's explanation fits. "Clothing itself is not modest, or immodest," he says. "Any degree of clothing, including complete nudity, is perfectly modest as soon as we become thoroughly accustomed to it."

THE USES OF TAR AMONG INDIANS

A STRING of 33 dark, unattractive beads made from tar and found in the islands of the Santa Barbara Channel, is stated by experts to be an Indian relic of a kind hitherto never discovered. The beads are part of a valuable collection from southern California just acquired by the Museum of the American Indian, Heye Foundation.

The striking feature of the collection is the variety of uses which the California Indians found for tar. Crude lumps of bitumen cast up by the sea from subterranean tar pits made the only natural cement known to have been used by the Indians, according to Arthur Woodward, of the museum staff. Besides caulking their split plank canoes with the crude tar, they used it to fit together sections of their stone smoking pipes.

The early Spanish explorers described the men and women who came out to meet the Spanish ships, and mentioned the bone hair ornaments of the women which were encrusted with bits of iridescent shell inlaid on the bone with tar cement. The museum collection contains several of these hair ornaments, long flat fragments of deer bone. One, over nine inches long, has at one end a broad band of small shell beads fastened to the bone with the tar cement.

This form of ornament was found on many of the most prosaic household utensils, the cooking pots, cups, ladles and mortars. These are of stone or shell, as the islanders made no pottery.

"Like most of the native Americans, the islanders were musically inclined," Mr. Woodward says. "They made flageolets of the leg and wing bones of cranes and seagulls and other large birds, and here again bitumen came into use. The rims of the stop-holes were rings of pitch decorated with shell, while the reed in the mouthpiece of the flageolet was replaced by a small lump of bitumen. Even to-day, after years of disuse, some of the old musical instruments give forth the same shrill notes that were heard in the round thatched houses of the original musicians.

ITEMS

CLOTHES moths really do have a hard time chewing up woolen cloth and other fabrics of animal origin that have been impregnated with one of the various moth-proofing solutions now in wide use, according to Dr. E. A. Back, of the bureau of entomology of the U. S. Department of Agriculture. It is misleading, however, to offer an absolute guarantee of protection, and the common method of merely spraying the fabrics confers but little protection. The only way to do the job thoroughly is to wet the cloth through while it is still in the whole piece, and many manufacturers have installed special machinery for this purpose. One of the favorite and most widely-advertised moth-repellants consists of 97 per cent. of water with 3 per cent. of sodium aluminum silicon fluoride dissolved in it. Though this solution sells at a very high price under its copyrighted trade name, it really does work, if thoroughly applied. Another newly-marketed class of compounds is made of the cinchona alkaloids, chemically allied to quinine.

THE story of an Indian chief who has dictated to his secretaries a history of his tribe from the creation of the world as it is related in myths has just been brought back from Panama to Sweden by the explorer Erland Nordenskiold. Professor Nordenskiold is the son of the famous discoverer of the Northeast passage from the Atlantic to the Pacific Ocean. A copy of the Indian history is one of the rare trophies of his expedition. Professor Nordenskiold and his wife and other members of the party suffered severely from fevers and tropical diseases. While he visited the famous White Indians and the Choco tribe of Panama, his special interest was the Cuna tribe of the Atlantic coast. The Cunas are people of good intelligence and culture, who cling to their old traditions. The ruler, from whom the history of the world was obtained, employs two secretaries, one familiar with Spanish and one with English.

THE Chinese drug, ephedrine, that seemed for a time to rival the effects of adrenalin, the extract of the suprarenal glands famed for its so-called power to bring the dead to life, is not so potent as was at first believed, according to a report just made to the American Pharmaceutical Association. Ephedrine was isolated from a Chinese plant in 1887, but first received serious consideration in recent medicine through the researches of Dr. K. K. Chen at the University of Wisconsin. There seems to be little doubt that the drug possesses considerable merit in raising blood pressure, but recent investigations undertaken by Dr. L. W. Rowe, of the Parke, Davis & Company Laboratories, indicates that there is little evidence that it will supplant adrenalin as the first clinical reports led many physicians to believe. Dr. Rowe's work has shown that the new drug has a more lasting action when given hypodermically in large doses, but that its value when given by mouth has been somewhat exaggerated.