SCIENCE NEWS

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ULTRAVIOLET RAYS AND VIRUS DISEASES

TESTS of ultraviolet rays as a weapon against epidemics of influenza or other virus-caused diseases that may follow the war are now under way at the Westinghouse Lamp Laboratories at Bloomfield, N. J., of which Dr. Harvey C. Rentschler is director.

In his laboratory stand row after row of test-tubes, cloudy from the pus germs growing inside them. These germs are the staphylococci that cause boils and other skin infections. When a few drops of a staphylococcus bacteriophage are poured into the tubes, the cloudiness disappears, because the bacteriophage has destroyed the staphylococci.

The staphylococci and the bacteriophage have no direct connection with influenza or colds. But they are part of the elaborate set-up devised by Dr. Rentschler to test the power of the ultraviolet rays to kill germs that cause influenza, colds, infantile paralysis and the like. These germs are viruses. Unlike the staphylococci of boils and other bacteria, the bacteriophage and other viruses can not be seen even under very powerful microscopes. Shadow pictures of them have been taken with the electron microscope, but except for these, the viruses have remained completely invisible. Yet they take a staggering toll of life in man, plants and animals.

How to tell whether you have killed or paralyzed something you can not see is part of the problem to be solved in order to test the possibility of using ultraviolet light to stop epidemics caused by these invisible agents of disease. Dr. Rentschler believes that it can be solved with the staphylococci and the bacteriophage that lives on them. Bacteriophage is a virus, although it does not attack humans. If it can be destroyed by ultraviolet rays, perhaps the rays can kill other viruses that do attack man.

You can actually see whether or not bacteriophage has been destroyed. If, after it has been irradiated with ultraviolet, it fails to clear up the cloudy tube of growing staphylococci, it seems logical to conclude that it has either been killed by the rays or at least has lost its ability to destroy the staphylococci.

Experimentally it isn't just as simple as that. Dr. Rentschler points out that chance plays a large part in such a test, for he has no idea of the number of bacteriophage particles that go into a given bacteria-infested tube. Individual drops of solution may contain one active particle, or a million. They can not be counted in an electron microscope because the electron beam probably would destroy their potency as quickly and surely as ultraviolet rays. So the only scientifically accurate approach is to make thousands of tests until observed results can no longer be attributed to chance.

GAS GANGRENE

A NEW kind of gas gangrene threatens workers in America's war industries unless care is taken to guard open cuts and wounds from magnesium splinters and dust, it appears from a report by Dr. Carey P. McCord, of the medical department of the Chrysler Corporation at Detroit.

Metallic magnesium and some of its alloys, the newest widely used metal in war industries, have been found to produce a unique gaseous condition when they get into wounds. Unless the magnesium is properly and completely cleaned out of the wound, even trivial injuries may become serious and prolonged. The condition that results is similar to gas gangrene, a serious war wound danger, except that it is caused by the magnesium instead of by germs. According to reports received, this kind of chemical gas gangrene has been very prevalent in German industries with as many as 5,000 cases in 1939.

The studies by Dr. McCord, Dr. Stuart F. Meek and Dr. Gordon C. Harrold, also of the Chrysler Corporation, are believed to be the first in the United States showing the danger of not cleaning out all metal particles or dust from a wound in which magnesium particles might be involved. "Early in our investigation," Dr. McCord reported, "we found that rat wounds in which small particles of magnesium had been introduced, unlike those contaminated with most metals, glass and wood, promptly lead to hydrogen gas formation in the tissues. The quantity of gas we found to be extensive and if neglected probably would produce a condition akin to a chemical gas gangrene. In the presence of magnesium particles it was discovered that hydrogen was evolved from the fluids of the tissues themselves and if the metal was not immediately extracted, would form a gaseous tumor. Thus it would seem that injuries resulting from not cleaning all magnesium particles from wounds may be much more serious than ordinary industrial injuries. The danger of this effect of magnesium calls, in the first place, for special preventative procedure against accidental injuries where magnesium particles might be involved, and in the second place, the availability of immediate proper medical care. The complete removal of all metallic magnesium apparently is vital."

A SOYBEAN RUBBER SUBSTITUTE

INVESTIGATORS in the Department of Agriculture hope to develop a process whereby they believe soybean meal can be transformed into a substitute for rubber. The process, which for military reasons can not be described in detail, consists of a series of chemical changes which finally transform the protein molecules of soybean meal into molecules similar in structure to those of rubber.

"Soybean rubber," according to chemists of the bureau, "won't come the day after to-morrow, but it's on the way. It's possible on paper."

Meanwhile soybean oil already is being substituted for tung oil in paints. Tung oil was imported from China before the war, and diminishing stocks lend special emphasis to soybean substitutes.

Adhesives, plastics, paper finishes and substitute-wool fibers are other uses for soybeans—uses developed largely

by American Government and industrial chemists since 1936 when the soybean laboratory of the Department of Agriculture was set up at Urbana, Ill.

The production of a synthetic fiber from soybeans has already been begun by the Ford Motor Company. The fiber is similar to sheep's wool. It is spun from a molasses-like substance that contains soybean protein. "Pilot" mills at Highland Park, Mich., can spin 1,000 pounds of fiber daily. The Highland Park mills are being moved to Dearborn, where they will undertake regular production. The synthetic product is best when blended with sheep's wool. The soybean fiber is considerably less than half as expensive as wool.

A POSSIBLE PACIFIC NORTHWEST IRON AND STEEL INDUSTRY

CREATION of a great iron and steel industry in the Pacific northwest to provide the basic war metals now vitally needed is believed possible owing to the discovery by government geologists of rich, high-grade iron ore deposits in Kasaan Peninsula, southeastern Alaska.

The deposits are less than 600 miles from Seattle by the "inside passage" along the Canadian coast protected from submarines by off-shore islands.

With limitless power now available from Grand Coulee and Bonneville dams the Pacific northwest's dream of an iron and steel industry equal to Youngstown and Bethlehem becomes more real.

Two geologists of the U. S. Geological Survey have announced that the iron deposits on the Alaskan peninsula are far richer than even suspected. It is hoped that private industry will take the hint and send other geologists to verify their find.

Copper was mined thirty years ago on the Kasaan Peninsula, and in 1917 the area was appraised as a "possible" source of iron. John C. Reed and George O. Gates, of the survey, however, this year found the iron deposits far richer than they expected.

Their examinations appraise the iron content of the ore as high as 60 per cent. It is reported by Drs. Reed and Gates that many of the individual bodies of high-grade magnetite probably contain between 25,000 and 2,000,000 tons each, and some of the bodies may contain even more than 2,000,000 tons. These substantial deposits, if their grade holds with depth, may have national significance in connection with the large hydroelectric installations at the Grand Coulee and Bonneville power projects. The availability of large quantities of cheap electric power in the Pacific northwest area, coupled with the needs for iron and steel of the war machine, focuses attention of expanding industrialization not only on the Kasaan deposits, but also on similar deposits on Texada and Vancouver Islands, British Columbia, and in the vicinity of Copper Mountain, Prince of Wales Island, Alaska.

ITEMS

STOCKPILES of rubber and other strategic materials should be maintained after the war as well as during the war and the United States government should immediately appropriate $100,000,000 for the development of synthetic rubber, was pointed out by Dr. Harry N. Holmes, head of the department of chemistry of Oberlin College, on assuming office as president of the American Chemical Society. "Many contend," he continued, "that we are promised free access to raw materials all over the world when peace comes. But treaties have been broken before and we must not again be caught napping."

ON the "scorched earth policy," the glaciers which invaded North America a million years before the birth of Christ could teach even the Russians a thing or two, according to a report that Professor R. F. Flint, of Yale University, made at the Boston meeting of the Geological Society of America. Whereas the Soviets burn the standing crops on the rich soils of Russia, the great ice fields took along the soil itself down to bed rock. Dr. Flint described to the meeting the first glacial map of North America, a cooperative scientific venture directed by twelve American geologists and four Canadians. Each inch on the map represents 60 miles and the vast area covered by the finished map will require seven feet from north to south.

A DEVICE which allows double-quick counting of stars on a photographic plate has been successfully tested and used at the Warner and Swasey Observatory at Cleveland. Dr. S. W. McCuskey reported on the use of this instrument before the meeting of the American Astronomical Society. His instrument counts stars as faint as the fifteenth magnitude, regardless of the number of stars on the plate. At present, the machine counts are made by an observer who places each star image in the sensitive beam of the photometer. Thus far completely automatic scanning of the plate has not yielded results accurate enough for statistical purposes. The rate of counting, including the necessary calibration and setting, is about 2,000 stars per hour. A run over a given area of the plate results directly in the number of stars brighter than four arbitrarily chosen magnitude intervals.

STUDENTS born in the spring are taller, heavier and smarter than those born during summer, a survey published in the December issue of *Human Biology* appears to indicate. The survey concerned 10,005 students of the University of Cincinnati, born between the years 1904–1921, inclusive. It was conducted by Dr. Laurence B. Chenoweth and Richard G. Canning of the Student's Health Service. The study also showed that students are taller than those of just two decades ago. The average height of freshmen in the University of Cincinnati in 1916 was 67.5 inches—in 1936 it had increased to 69.9 inches. Since 1936 there has been no increase in the average size of freshmen students at the university. Not only has the size of man increased, the scientists say, but children are growing more rapidly. This increase in size and rate of growth is explained by Dr. Chenoweth and Mr. Canning by decreased communicable disease, better food, knowledge of vitamins and generally improved living conditions during the last half-century.