

● Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenter:

Friday, Sept. 8, 7:04.8 a.m., EST

In the North Pacific, near the Aleutian islands. Latitude 52 degrees north, longitude 175 degrees east (approximately). A strong shock.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL, June 17.

vantage of being able to carry a bursting charge, whereas the cannon of that day fired only solid projectiles.

The Congreve rocket is permanently memorialized in our national anthem. In 1813, British frigates were equipped with these rockets, and when their fleet attacked Fort McHenry on Baltimore Harbor, one anxiously watching prisoner on a frigate deck caught glimpses through the night of a flag, still defiantly flying, by "the rockets' red glare."

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Science News Letter, September 16, 1939

GEOGRAPHY

Airplanes Raise Question Of How High Neutrality Goes

UNKNOWN airplanes roaring high above neutral Holland raise the question how high neutrality extends. Legally the limit of ownership is as high as up—beyond the sky is the limit. But the famous three-mile limit for ships at sea was set as the limit of shore big guns.

The highest up of anti-aircraft guns, a practical limit of neutrality, is about 40,000 feet or eight miles. Will that become the usage if not the law?

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MICROBIOLOGY

Bacteriology of Foods Extremely Important in War

Botulism Can be Prevented by Cold Treatment in Foods Too Delicate For Ordinary Heat Processing

"FOOD will win the war!"

That slogan, heard in the close-rationed days of 1917-18, will become loud again with war raging in the present-day world. Micro-organisms in relation to food and its storage therefore occupied an appropriately prominent part in the Third International Congress for Microbiology meeting in New York City.

Most important of the bacteria to be guarded against is the species *Clostridium botulinum*. This is not a food spoiler; it leaves the food in which it lurks innocently inviting—and strikes the eater with an always severe and sometimes fatal food poisoning afterwards.

A three-man research team from the University of Illinois, Drs. F. W. Tanner, P. R. Beamer and C. J. Rickher, told of their investigations on certain food products liable to infestation with this dangerous organism, which are spoiled for market purposes if they are given sufficiently severe heat treatment to destroy the bacteria. Fortunately, however, it was found that the same food-stuffs could be adequately preserved by cold against the deadly *Clostridium*.

From far-off Japan came a report of research on sea foods, by Dr. Yuzo Tohyama of the University of Tokyo. Characterizing his people as "the first rate fish eating nation in the world," Dr. Tohyama related how he has used more than 200 different chemicals in his search for effective means to find a disinfectant that will clear fish, shellfish and other sea foods of disease-causing and spoilage-producing bacteria and still leave them palatable and wholesome for human consumption.

Bacteria in foods are of course not always spoilers or poisoners. Dr. N. E. Gibbons of the Canadian National Research told of the role played by bacteria in the curing of the famous Canadian bacon. The bacteria swarm thickest just where the pickling fluid makes contact with the meat, and it is at this interface, Dr. Gibbons believes, that they do most of their beneficial work.

War Against Germs

MAN'S chemical warfare against the germs that invade his body occupied a leading part in discussions. Especial prominence was given to the powerful new weapons, sulfanilamide and its related chemicals.

Just how sulfanilamide acts against bacteria is still pretty much of a riddle, it was admitted by Drs. Eleanor A. Bliss and Perrin H. Long of the Johns Hopkins Medical School. It has been known for some time that in the presence of small quantities of the chemical, germs of the group known as cocci are not killed outright but stunned or paralyzed, so that the body's own fighting forces can make an end of them. However, in the researches reported by Drs. Bliss and Long, it has also been shown that stronger concentrations of sulfanilamide kill the bacteria outright.

Another point developed was that the effectiveness of certain compounds of sulfanilamide seems to be due to their chemical decomposition, releasing "straight" sulfanilamide in contact with the bacteria.

Experiments in which sulfanilamide and sulfapyridine were used, either alone or in combination with injections of immune sera, on mice exposed to infection with meningitis were reported by Dr. Sara E. Branham of the U. S. Public Health Service:

"In general, it may be said that, weight for weight, sulfapyridine protected mice better than sulfanilamide, and that the combination of either sulfapyridine or sulfanilamide with serum gave better protection than either the drugs or the serum did alone."

Vitamins for Microbes

THE SMALLEST plants, no less than the largest animals, must have their vitamins, hormones and other minutely concentrated but physiologically powerful substances if they are to live and grow, it was made plain in discussion be-

fore the Congress. Not less than a dozen such substances are needed, said Dr. William J. Robbins of the New York Botanical Garden. To a very large extent, microscopic plants and full-sized animals need and use the same growth-promoting substances.

One such substance, only recently discovered, was given the name "coenzyme R" by Dr. Franklin E. Allison and Francis W. Minor of the U. S. Department of Agriculture. It has been found indispensable for the growth of the nitrogen-fixing bacteria that live in the roots of clover, peas and related plants. The bacteria need very little of it; they would grow and multiply in solutions containing as weak a dilution as one part in a million. But that much at least they had to have in order to grow at all.

Other bacterial growth-promoting substances, necessary in equally minute minimal quantities, were described by Drs. P. W. Wilson and P. M. West of the University of Wisconsin. They found the same substances present in yeast as well as bacteria.

Another nitrogen-fixing bacterium, *Azotobacter*, that lives free in the soil instead of in plant roots, has been found to require minute traces of molybdenum, the same metal that is used in hardening modern high-grade steels, and even smaller quantities of tungsten, the metal used in electric lamp filaments. Researches establishing these facts were reported by Drs. Dean Burk and Kenneth Horner of the U. S. Department of Agriculture.

Linked With Rheumatism

RELATIONSHIP between rheumatic fever and pneumonia has been traced by Drs. Homer F. Swift and Thomas MacPherson Brown of the Rockefeller Institute for Medical Research, they reported.

Exudates oozing from the tissues of sufferers with rheumatic fever were cultured in various ways, both in the lungs of mice and on the embryonic membranes of incubated eggs. On the membranes the cultures produced characteristic lesions, and in the mice they caused pneumonia.

Microscopic examination disclosed the presence of the extremely small microorganisms known as pleuropneumonia bodies, which seem to have a size between the smaller types of bacteria and the invisible filterable viruses. Indeed, under certain circumstances the pleuropneumonia bodies themselves will slip



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Two other strains of filterable organisms of the pleuropneumonia type, found in mice, were reported on by Dr. Albert B. Sabin, also of the Rockefeller Institute. Strain A, which thrives either in the brain or in certain other tissues of the body, produces a toxin that either kills outright or leaves the animal crippled with symptoms like those of chorea. Strain B "has an almost specific affinity for the joints, in which it gives rise to a chronic, progressive, proliferative, ankylosing arthritis which clinically and pathologically resembles rheumatoid arthritis in man."

Danger to Unborn Babies

VIRUS diseases like smallpox, influenza and infantile paralysis may carry a special menace to unborn babies, Drs. N. Paul Hudson and Oram C. Woolpert of Ohio State University pointed out. Recent experiments have shown that viruses of many types can be raised in the laboratory on the embryonic membranes of incubated eggs when they will not grow on non-living culture media, they stated. In a similar way, the two Ohio researchers have made use of the unborn young of animals like guinea pigs. This has suggested to them the possible pre-birth dangers that may lie in wait for the young of the human species, to whom viruses could be carried in the mother-to-child circulation.

Rabies Virus Cultured

FROM the Far East and the Near East came simultaneous reports of a bacteriological feat long considered impossible: the growing of the virus of rabies in glass laboratory flasks instead of in the brains of living animals. Prof. K. Kanazawa of the University of Tokyo made the deadly stuff grow by feeding it minced brains of either rabbit or chick

embryo. In experiments of Prof. I. J. Kligler and Dr. H. Bernkopf of the University of Jerusalem, it was grown on a medium consisting of coagulated human blood plasma and mouse embryo brain. Raising of rabies virus in this way will make easier the work of those who are striving to save both men and dogs from the ravages of this terrible disease.

Jekyll-and-Hyde

BACTERIA and other forms of microbes are changeable creatures. Some of their Jekyll-and-Hyde shifts were described by Dr. Hobart A. Reimann of Jefferson Medical College, Philadelphia. He told of a strain of meningitis germs which he isolated from a patient and kept in culture for four years. At the outset, masses of it growing on nutrient media were white. In time, however, he isolated four sub-types that displayed color, and from each of these in turn were developed still further variations.

Yet not all bacteria are thus unstable. Dr. J. Howard Brown of the Johns Hopkins Medical School told of strains of the dangerous streptococcus which he has kept for many years without any detectable change. Some cultures were kept dried in a vacuum, for as much as twenty years; at times, however, they were brought to active life on culture media and run through series of many transfers from one tube to another. Through it all they have remained true to type.

Arsenic Poisons Germs

ARSENIC compounds may take their place alongside of sulfanilamide as weapons against infecting bacteria. Drs. S. M. Rosenthal and Hugo Bauer of the U. S. Public Health Service related results of their tests on certain aromatic arsenic derivatives, on mice with micrococcal infection. A compound known as p-nitrobenzoic acid, and some related

compounds, were found especially effective.

Virus Inhibitors

VIRUS diseases of plants, like leaf mosaic, curly top and "frenching," can be prevented under laboratory conditions by treating the virus with certain substances before it is inoculated into the plants. Whether this effect is due to something that happens to the virus itself or something that happens to the plant has been a moot question with plant pathologists.

Dr. James Johnson of the University of Wisconsin told of experiments in which it was indicated that the effect is due to direct action on the virus. Substances used ranged from cow's milk to pokeweed juice. Even when used in concentrations so low as to be unlikely to affect the plant, they still had an inhibiting effect on the viruses.

Trichinae in Swine

TRICHINAE, the muscle-boring parasites that cause painful and occasionally fatal illness in eaters of inadequately cooked pork, are widely distributed in the United States, stated Dr. Benjamin Schwartz of the U. S. Department of Agriculture. In grain-fed swine, however, they are not nearly as abundant as in those fed on garbage. On the basis of thousands of examinations of slaughtered animals, Dr. Schwartz gave the percentage of trichinae-containing carcasses as less than one, for grain-fed hogs, whereas it was 5.7 in garbage-fed hogs. The vast bulk of hogs slaughtered in the United States, Dr. Schwartz added, are grain-fed.

Skin a Maginot Line

EFFECTIVENESS of the human skin as a Maginot Line against bacterial invasion was dramatically demonstrated in experiments by Drs. Marshall W. Jenkinson and Irwin W. Sizer of the Massachusetts Institute of Technology.

They swabbed broth containing millions of living bacteria on the inner skin of the forearm, and then at intervals took swabbings off again and tried to grow germs from them. No viable bacteria could be recovered after the skin had naturally dried, which took about four minutes. Only when the tough, resistant resting spore stages of other bacteria were placed on the skin was survival possible.

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Rabbit Fever in Japan

A FORM of rabbit fever known as "yato-byo," similar to the tularemia known in the United States, exists in Japan, reported Dr. Hachiro Ohara of the Fukushima Experiment Station.

Although tularemia and yato-byo are caused by the same organism, the records of the two diseases are quite different, for the death-rate from yato-byo is zero. Dr. Ohara ascribed this not to a lower virulence on the part of the bacterium, but to "the constitution of the Japanese." The Japanese malady is carried only by wild rabbits, whereas in America tularemia is carried by many other species of rodents, and is also transmitted by the bite of blood-sucking insects and arachnids, such as the horsefly and wood ticks.

Cancer Caused by Viruses

CANCER, at least of certain types, is caused by filterable viruses, and thereby joins a numerous and varied group of human ills including smallpox, influenza and infantile paralysis: such is the conclusion toward which points the evidence presented to the meeting.

Three converging lines of evidence were presented by Drs. James B. Murphy and Albert Claude of the Rockefeller Institute for Medical Research, by Drs. Jacob Furth and Elvin A. Kabat of Cornell University Medical College, and by Dr. F. Duran-Reynals of Yale University.

Fluids from malignant transplantable tumors of chickens were whirled in the ultra-centrifuge, passed through fine-pored filters, and otherwise treated after the manner of virus-containing fluids in known animal and plant diseases. Materials obtained from these cancer-fluid filtrates, injected into the tissues of healthy chickens, produced typical cancerous growths.

In the researches reported by Dr. Duran-Reynals, chicks responded to doses of a tumor virus by developing fatal hemorrhages and degeneration of tissues, without the development of tumors. However, extracts obtained from such chicks produced the characteristic growths when injected into healthy adult fowls.

Similar evidence for virus causation of cancers in rabbits was reported in communications by Dr. Jerome T. Syverton of the University of Rochester and Drs. John C. Kidd and Peyton Rous of the Rockefeller Institute. A virus was indicated as the probable cause of kidney

cancer in frogs, by Dr. Balduin Lucké of the University of Pennsylvania.

Fever From Monkeys

AFRICAN monkeys may become immune carriers of yellow fever without being bitten by mosquitoes, was the warning that came from London in a paper by Drs. G. M. Findlay and F. O. MacCallun. They introduced yellow fever virus artificially into the stomachs of monkeys, and found that it retained its virulence. Other animals, including man, could not be thus converted into carriers. Apparently the high acidity of their gastric juices inactivated the virus.

"If non-biting arthropods with a long life span carry yellow fever virus and are occasionally eaten by monkeys, a solution would be found of the continuance of yellow fever in dry seasons when mosquitoes are absent or rare, the London researchers pointed out. "Attention is drawn to the survival of yellow fever virus in cockroaches."

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ENGINEERING

New Instrument Aids in Making Airplanes Safe

See Front Cover

IF THERE is moisture in the supposedly dry annealing gases, high-carbon steel decarburizes and becomes unsatisfactory for many uses. Airplane gears made when the moisture was present will not stand up in service.

The portable dew-point potentiometer shown on the front cover of this week's SCIENCE NEWS LETTER was devised by General Electric engineers to detect such damaging moisture.

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GENERAL SCIENCE

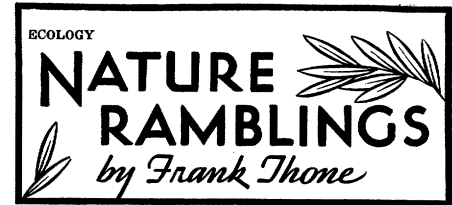
Genetics Congress Members Find They Are "Entangled"

AMERICANS at Edinburgh's war-clouded International Genetics Congress found themselves literally entangled when Scottish soldiers strung barbed wire around their dormitory.

Explanation: Dormitory would be needed after Americans left, for internment Germans.

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A new device tests the smoothness of a metal or painted surface, detecting variations as slight as one millionth of an inch.



Treeline Stays Put

IF THE American climate is changing, the timberline trees of the northern Rockies have not found out about it yet. Their "farthest up" seems to be neither advancing nor retreating, studies by Prof. Robert F. Griggs of George Washington University indicate.

Prof. Griggs' earlier investigations in Alaska showed that the northern boundary of the forest, at Kodiak, is actively migrating into the Arctic. He therefore wanted to know whether mountain trees in more southerly latitudes were showing a corresponding tendency to venture higher upslope.

Presence of large numbers of young trees in certain parts of the mountains had given rise to reports that such was the case. Closer investigation, however, disclosed fallen trunks of much larger trees, usually charred, among the younger growth. The young trees therefore are only replacements, following fire or other devastation. The mountain treeline is not advancing.

Timberline trees sometimes achieve great age, Prof. Griggs reports. In the Teton mountains, at about 10,000 feet elevation, he found an erect whitebark pine with a girth of nearly twelve feet. Estimates based on known growth rate give an age of about 1,800 years for such hardy giants as this.

The familiar alternation of timbered and bare strips running straight up mountain slopes Prof. Griggs relates to snow accumulation in the ravines. Trees do not thrive in the moist ravines, as might at first thought seem likely. They follow the ridges instead. This is because the deep snow masses in ravines, by sliding and creeping, tear out most of the young trees that sprout there during the summer. On the ridges, however, there is less snow and therefore little sliding, so that trees can survive.

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