

Certified Stains Aid Diagnosis

Bacteriology

War in the world of the invisible occupied the attention of the members of the Society of American Bacteriologists who met at Richmond just after Christmas. Here are some of their new discoveries:

The diagnosis of a number of diseases depends largely on biological stains or dyes. When the doctor takes a swab from your throat for a culture to determine whether or not you have diphtheria, he must use a stain called methylene blue in order to see under the microscope the germs that grew in the culture from your throat. Naturally, the stain must be dependable, or the diagnosis may be inaccurate. For this reason a Stain Commission has been established to certify biological stains.

Thirty-eight stains have been put on this certification basis, Dr. H. J. Conn of the New York Agricultural Experiment Station reported to his fellow bacteriologists. In 1923 almost half of the samples submitted to the commission were refused certificates. In 1928 only 3 per cent. of those submitted were refused, said Dr. Conn, commenting on the improvement in the stain supply. Attempts are being made to secure the coopera-

tion of the Federal Specifications Board in drawing up specifications for stains in harmony with those of the Stain Commission.

A temperature difference of nine degrees Centigrade is significant in determining whether bacteria contaminating water are from intestinal discharges of man and other warm-blooded animals or from cold-blooded animals, such as fish, is the conclusion reached from experiments of the late Laban W. Leiter. An account of the study was reported by William W. Ford of the Johns Hopkins University School of Hygiene and Public Health. Certain strains of a type of bacteria known as *Bacillus coli* from men and warm-blooded animals ferment dextrose broth when grown at 46 C. Certain other stains of bacteria appear to be like *B. coli* in every respect, but they will ferment dextrose broth only when grown at 37 degrees Centigrade. These strains are from cold-blooded animals and are probably of no significance when found in water. The discovery of this difference probably will have an important

bearing on the question of detecting sewage pollution in water.

Ultraviolet Light From Bacteria

Substituting machine oil for gelatin as sensitizer of photographic plates made it possible to photograph the ultraviolet light given off by the roots of certain growing plants and by certain bacteria, Ralph R. Mellon, N. von Rashevsky and E. von Rashevsky of Pittsburgh reported to the society.

A European scientist, Gurvitch, found that rootlets of growing onions and certain other plant tissues gave off this light, which is the same that is used to prevent and cure rickets, although of much shorter wave length. He was unable to photograph this light with the ordinary photographic plates. The Pittsburgh investigators, having found a way out of the photographic difficulty, also found that the light is given off by an organism which occurs in sewage and in the intestines and is known as the colon bacillus. The light seems to be due to radiation and to electron emanation and has been (*Turn to next page*)

Insects Could Survive Outer Space

Entomology

Much speculation has been indulged in by romanticists, and even by sober students of the history of life, on the possibility of the transplantation of germs of living matter from an old planet to colonize a new one. Some evolutionary thinkers have suggested that the original spark of life may have been kindled on our own earth in this way. Others have denied such a notion, claiming that nothing could survive the awful emptiness of interstellar space.

But Dr. Frank E. Lutz, of the American Museum of Natural History, told members of the American Association about experiments wherein he had subjected insects to vacuums approaching in completeness the void of outer space. The high-power air pumps sucked out all the atmosphere of the vessels in which the insects were confined, down to a point where a potential of 30,000 volts could no longer produce an electrical discharge; a higher vacuum than obtains in the most modern X-ray tubes. Yet nearly all the insects lived through at least a short exposure to this, and also survived the shock of having

normal atmospheric pressure restored almost instantaneously.

In low-pressure experiments where the air was reduced merely to a point where a human being could not have lived, a big milliped, or "thousand-legged", was able to live and run inside of a tiny squirrel-cage wheel built for him, without missing a stroke with a single one of his legs. Instead of slowing down as the air was exhausted, the many-legged arthropod appeared to be "pepped up" by the artificial Himalayan atmosphere, and walked faster and faster.

Insect Studies Aid Culture

Entomology, popularly conceived of a few years ago as a mild form of madness, is due to receive recognition as a distinct contributor to mental development and culture, in the opinion of Prof. Royal N. Chapman of the University of Minnesota, who spoke before the Entomological Society of America. The cultural value of the study of insects, the speaker said, has been overshadowed largely by its great success in the economic field; but though it has received much less

formal recognition from the universities of Europe than it has in America, entomology has taken a more firm hold on the minds of those who cultivate it just because it is interesting and mentally useful.

Prof. Chapman told of recent experiences in Europe: "A year ago I was on leave of absence for fifteen months and had the first opportunity to think that I have had since I was promoted to be the head of a department. I saw professional and amateur entomologists in various countries and reflected upon the conditions in America, from a distance. It was my privilege to come in contact with some of the amateur entomologists of Europe. I visited them personally and saw them collectively in the meetings of their societies. I was greatly impressed with their interests and was convinced that most of them went beyond the mere collecting of insects or the mere observing of insects' habits. They reflected upon their observations. They built up a philosophy of life far above that of the average person." (*Turn to next page*).

Bacteriological Meetings—Continued

called mitogenetic rays.

Few Germs in Nuts

Nuts do not increase the number of germs in candy. In fact, the nuts themselves have fewer bacteria than candy has, Prof. John Weinzirl of the University of Washington has found. Whatever germs are on the nuts get there from the hands of the persons selling them, just as the germs on candy get there from the hands of the candy salespeople, Prof. Weinzirl reported.

F. C. Harrison and W. Sadler of McGill University, Montreal, reported that the greenish-yellow discoloration on halibut is due to an organism found in large numbers in the artificial ice used for packing the fish in boats. This ice is all obtained from upland waters. The organism is also present in large numbers in bilge waters but not in sea water at a depth of 30 to 50 fathoms nor on freshly caught fish.

Spoilage in tomato products, such as sauces, canned tomatoes and soups, is due to bacteria that produce lactic acid, reported Carl S. Pederson of the New York Agricultural Experiment

Station at Geneva, N. Y.

The "waterless process" of canning string beans does not give greater protection against botulism bacilli than the brine method, reported Lawrence H. James of the U. S. Bureau of Chemistry and Soils. Experiments showed that the entire contents of a can of waterless processed string beans may become poisonous from the presence of a single infected bean. The organism spreads just as readily through the contents of the waterless processed can as through the beans canned in brine.

Substitute Bacteriophage

Bacteriophage, deadly enemy of disease germs, is being substituted for typhoid vaccine as a means of protecting persons from typhoid fever, Dr. N. W. Larkum of the Michigan Department of Health reported.

The study has been carried on among inmates of state institutions. The power of the blood to kill disease germs is greater when the subjects are given bacteriophage than when they are given typhoid vaccine, Dr. Larkum reported. A single inocu-

lation of bacteriophage had more lasting effect on the blood than a single inoculation of the vaccine. This has a bearing on the length of time the immunity to typhoid fever will last. Three inoculations of bacteriophage, however, gave less satisfactory results than a single inoculation.

Glass Stops Rays

Experiments showing that the power of sunlight to destroy disease germs is directly affected by passage through glass were reported at the meeting of the society by Theodore W. Hausmann of Concordia College. In the study cultures of germs were exposed to direct sunlight, to sunlight coming through plate glass and through glass transparent to ultraviolet light. Roughly, the number of colonies of germs that developed may be expressed as follows: with no sun, or shade, 11 colonies; with plate glass, 8 colonies; with glass transparent to ultraviolet light, 5 colonies; with direct sunlight, 3 colonies. The number of colonies that develop from a culture indicate to bacteriologists how many bacteria or germs are in the culture.

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Entomological Meetings—Continued

Parasites of Parasites

One of the worst pests in a greenhouse is the geranium aphid, one of the so-called plant lice, which every horticulturist knows to his sorrow. It is preyed upon by a little fly-like insect, which destroys it. This insect is in turn preyed upon by another—a secondary parasite, as the entomologists term it. And both the primary and secondary parasites become the victims of still another insect, which thus becomes, in part of its activities, a tertiary parasite.

This dizzy pyramiding of life-and-death battles with microscopic stiletos, in the small green jungle of the greenhouse bench, was described in detail before the meeting of the Entomological Society of America, by Dr. Grace H. Griswold of Cornell University. "As one studies parasites—primary, secondary, tertiary—one wonders if the end of parasitism is ever reached," she concluded, and harked back to the classic rhyme:

"Naturalists observe, a flea
Hath smaller fleas that on him prey,
And these have lesser fleas to bite 'em,
And so proceed, at infinitum."

Travels of an Insect

An American insect sheriff, pur-

suing an escaped American insect thug into all corners of the world, and always "getting his bug," was the tale told to members of the American Association by Dr. L. O. Howard of the Bureau of Entomology, U. S. Department of Agriculture.

The dispatch of the parasitic insect known as *Aphelinus mali* on its worldwide clean-up mission has been in the nature of a return for similar courtesies we have received from other countries, Dr. Howard pointed out. He said:

"The United States has purposely imported from other countries many kinds of parasitic wasps and flies to help kill accidentally imported plant pests. In this beneficial work the U. S. Bureau of Entomology has had much help from the officials of many foreign governments, but we have very rarely had the chance to help them in the same way.

"Within the past eight years, however, the U. S. Government has assisted many other countries to introduce and establish an important parasite of the woolly apple aphid, a pest of American origin that has found its way all over the world and has done great damage to the apple orchards of many countries.

"*Aphelinus mali* was carried by hand from Washington to Paris in 1920. It multiplied and was spread through the apple-growing regions of France. The same year it was sent from Washington to Uruguay, where its success was immediate in spite of the diametrically opposed seasons of the Northern and Southern Hemispheres. Since 1920 it has been introduced into Italy, Germany, England, Spain, Belgium, Holland, Switzerland, Austria, the Argentine Republic, Chile, New Zealand, Australia, South Africa and Japan. In very many of these countries it has been a great success, and notably perhaps in New Zealand, Australia, the South American countries and Italy. In nearly all of these countries it has shown itself to be a help in the control of the aphid at certain times; in others its usefulness is very limited.

"*Aphelinus mali* is now more widely distributed all over the world than is any other beneficial insect except the honey bee. It seems to thrive in many different climates and to control the aphid wherever the pest, by virtue of sandy soils, does not descend into the ground and damage the roots of the apple."

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