likely to spread among the general population. The water-borne epidemic, however, not only shows the possibility of the disease spreading through water but emphasizes again the health dangers of faulty plumbing.

Faulty plumbing was part of the combination of circumstances that led to the outbreak, which occurred on the campus of Michigan State College. The epidemic was limited to persons who had been in the bacteriology building, where the undulant fever germ was being studied. Only a few of the patients, however, had handled the germs. These got into the building's water supply from the dishes and test tubes used in growing and studying them.

Ordinarily dishes in which germs are grown are sterilized before being washed. This procedure was followed but the sterilization was inadequate. On top of this, the plumbing was such that the water in which the contaminated dishes were washed could be siphoned back into the water supplied to other parts of the building.

Science News Letter, July 15, 1939

GENERAL SCIENCE

German Science Decline Reported in AASW Survey

WHAT IS happening to German science under impact of National Socialism is reported in a documented report prepared by the American Association of Scientific Workers' Boston-Cambridge Branch. Upon such findings this young but active organization has recommended a boycott of German scientific materials as a means of combating Nazi ideology.

German universities have lost over half their students in the last five years. The 116,154 students of 1932-33 have decreased to 53,753 in 1937-38, which is 53.7% loss, with greater percentage losses in engineering and the natural sciences.

University teaching staffs dropped 15.8% net in size in four years under Hitler, and it seems likely that about 1500 scientific workers in universities were deprived of their positions for political reasons. The University of Vienna in one year of German occupation lost 48.1% of its teaching staff as contrasted with 6% the preceding year.

"The German universities and research institutes have been so reorganized that they appear to be no longer so well adapted for the training of new investigators and for the promotion of current research," the report declares.

Wide-spread opinion among American scientists, checked by surveys of actual work produced, provide inductive evidence of a decline in German scientific output. Research as measured by pages published in German chemical, biochemical and physiological journals has fallen off 50% or more, while English and American journals either show no change or an increase. There has been a relative increase in foreign contributors to certain journals, so German contributions are less than page counts indicate.

With a few exceptions made for men of outstanding reputation, teaching and development of theoretical physics have been for all practical purposes forbidden, the report declares. Physics and mathematics journals have lost quality, and in the case of the international abstracting journal Zentralblatt fur Mathematik, political interference has caused resignations of its American and many other foreign editors. The two leading German sociological journals are now published in Paris and New York, and the famous philosophical journal Logos has become a propaganda instrument.

Science News Letter, July 15, 1939

GEOLOGY

Hollow Bullets Fired Down Take Oil Well Samples

See Front Cover

HOLLOW "bullets" fired deep underground from special 18-shot well guns are the newest feat of petroleum geologists to get exact information on the location of salt domes, oil-bearing sands and other formations which mark valuable oil resources.

The hollow bullets are fired into the side walls of drill holes and take samples which give final answers to information obtained by electrical prospecting.

The oil well "gun" stands higher than a man and has a diameter sufficient to permit it to enter a 5-inch bore hole. It is pictured on the front cover of this week's SCIENCE NEWS LETTER. Along its length are three sets of six "bullets" each. Any one of the 18 can be fired electrically from the surface of the ground.

When electrical prospecting indicates interesting variations in electrical resistance which may mark a transition from water-sand to oil bearing sand at say 6,900 feet, is is only necessary to lower the sample gun to that depth and quickly obtain a specimen of the geological formations at that point.

Core sampling, state E. G. Leonarson and D. C. McCann in a report to the American Institute of Mining and Metallurgical Engineers, can obtain similar information but taking continuous core samples is a costly procedure not always economical in well drilling.

The new method, state the experts of the Schlumberger Well Surveying Corp., permits rapid cheap drilling with the ability at any later date to go back and obtain samples at any given point beneath the surface.

The bullets in the sampling gun are fired by powder and project an empty metal cylinder into the side of the well to a depth of several inches. Because the cylinder is open at both ends it passes through the meaningless mud which may line the sides of the drill holes and enters the true geologic structures. Strong wires attached to the "bullets" pull them out. To prevent loss of the whole gun by breakage of its cable the wires for each bullet have a lower strength than has the cable. If a bullet becomes stuck its wires break off before the cable does.

About 70 per cent. return on samples is obtained, the experts report.

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ENTOMOLOGY

Fly Makes Mosquito Carry Its Eggs to Human Victims

MOSQUITOES have long stood convicted of the crimes of transmitting malaria, yellow fever and other diseases by their bites. That is a relatively simple and easily understood process. A much more complicated job, in which the real villain is a tropical botfly and the mosquito is a bullied and helpless accomplice, is described in the magazine *Natural History* by Dr. C. H. Curran, associate curator of insects at the American Museum of Natural History.

Botflies are insects that lay their eggs on the skin of animals. The emerging larvae burrow into the tissues, where they live as parasites, causing more or less discomfort and pain, until they are ready to emerge as adults.

This particular botfly, however, never visits its victims, which include monkeys and other mammals as well as human

beings. It has learned, somehow, a most fantastic and complicated method of making mosquitoes carry its eggs for it.

When a female of this species has eggs ready to deposit, she haunts a spot where mosquitoes are emerging from pupation. When a mosquito comes out, still soft-winged and unable to fly well, she grabs it and retires to a secluded and quiet nook. There, holding the victim carefully, she proceeds to lay from ten to fifty eggs, sticking them to the body and upper legs of the mosquito. Then she lets it go.

Later, the mosquito alights upon a human or simian victim, seeking its normal meal of blood. Immediately the larvae within the eggs burst forth and make haste to the victim's warm skin, which they presently penetrate, to begin the parasitic stage of their life cycle.

The same species of botfly, Dr. Curran states, also finds homes for its young in the bodies of cattle, but the indirect method of egg deposition is different in this case. The flies merely lay their eggs on the underside of leaves in the high bushes, and from these positions of vantage the larvae find their way to the backs and sides of cattle that brush through.

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STUDYING DUST

The Navy Department is now getting ready to study the dust problem, cause of industrial diseases, on a larger scale. Assistant safety engineer Morris H. Mills is taking a dust photograph with this piece of apparatus which is designed to take samples of the dust content of the air and then to make a permanent record of the sample by photographing it on 35 mm. film. These film records can be studied and compared by enlarged projection on the Argus film viewer shown at the right.

ASTRONOMY

Star Emits Puffs of Smoke Causing Light to Vary

A STAR that periodically half-hides itself behind a puff of smoke, like an automobile with a dirty, soot-choked muffler, was described by John A. O'Keefe of Yerkes Observatory to the American Association for the Advancement of Science. This star, an inconspicuous member of the constellation Northern Crown, is a variable, that is, it undergoes periodic fluctuations in brightness.

Five years ago another astronomer, E. Loreta, suggested that the star produced its own dimmings by puffing out clouds of obscuring matter. Mr. O'Keefe's studies have now indicated that these clouds are probably composed of carbon dust—in effect, smoke.

The star apparently expels the carbon in the state of a vapor or gas, which speeds out to a distance of about four times the star's diameter and then condenses into solid particles.

Science News Letter, July 15, 1939

Unlike grasshoppers, Mormon crickets cannot fly in advancing on farm crops.

PUBLIC HEALTH

North Dakota Health Program To Resume in Improved Form

Fixed Trial Period, Not Failure, Cause of Plan's Abandonment; Dues to be $33 Yearly

THE FARM SECURITY Administration's health program in North Dakota, far from being abandoned as a failure, as a recent news report indicated, is to continue under an improved plan shortly after July 30.

Dues will be set at $33 per year, a slight increase over the $2 per month of the last plan.

"There is no justification for saying the plan has failed," Jesse B. Yaukey stated. Mr. Yaukey, statistician borrowed from the U. S. Public Health Service, is second in command of this division of the FSA under the chief medical officer, Dr. R. C. Williams, of the U. S. Public Health Service.

The lapse in operation of the health program for FSA clients in North Dakota is similar to the lapse which occurred in 1937, Mr. Yaukey explained. It is due to the fact that the FSA and medical groups in North Dakota have deliberately limited each of the plans so far tried to a definite period for trial purposes, with the idea each time of starting operations again under new plans improved from the experience gained with previous ones. The last plan was set up to run for eight months ending June 30.

Dr. Williams and Mr. Yaukey will meet on July 30 with the medical group in North Dakota to put the final touches to the plans already made for the new program of health service. As soon as possible after that date, the new program, worked out at a meeting in May, will go into operation.

The new program, it is planned, will