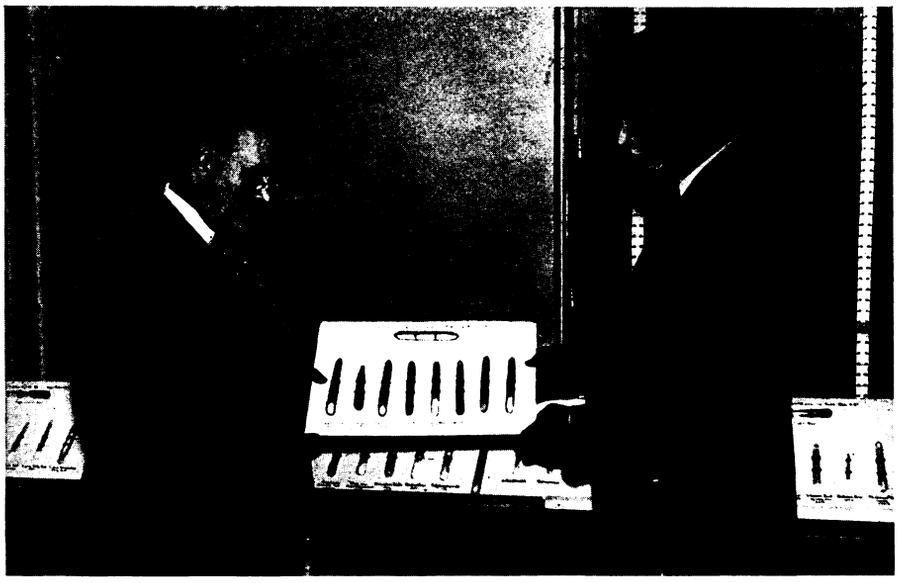

MADE BY A GERM

From the chemical "factory" of the tubercle bacillus, come a poisonous sugar, a poisonous protein, and the unique acid that produces tubercles all by itself. Prof. R. J. Anderson, of Yale University, (right) is showing Dr. William Charles White, of the U. S. Public Health Service's National Institute of Health, the tubes containing the first chemical fractions extracted from the TB germ. Each of these in turn was subjected to further extraction, and each fraction again extracted, until now Prof. Anderson has nearly 200 such tubes.

poisons that the research headed by Prof. Anderson is going on.

Dr. Anderson also looked for the chemical that gives the tb germ its reddish-brown color. He finally extracted this substance in the form of yellow crystals to which he gave the name phthiocol. There is only a tiny amount of this in the germ, but it probably plays a very active part in the germ's breathing process. From pounds of tb germs Dr. Anderson extracted what amounts to a good-sized pinch of the crystals, and this tiny bit represents the world's supply of natural phthiocol, outside of what is in living tb germs.

This phthiocol which has a very long chemical name had never before been found anywhere until Dr. Anderson discovered it in the tb germ's chemical factory. Shortly following the discovery of phthiocol the Yale chemists were able to prepare the substance in the laboratory by two different chemical methods, starting from the coal tar products, methylnaphthalene and naphthalene.

Within a year of the discovery of phthiocol two other methods of synthesizing it were described by other chemists while working on entirely different research programs. A Spanish chemist prepared the substance in the course of his investigation of plumbagin, the active principle of leadwort, and a chemist in Brooklyn, N. Y., prepared it by the careful gradual oxidation of lapachol, a compound found in the wood of the African lapacho tree.

The tb germ also makes a peculiar and characteristic sugar by the name of d-arabinose. Arabinose is universally distributed throughout the plant kingdom, but it is l-arabinose. The letters signify the way the chemical affects polarized light, a complicated matter of interest chiefly to chemists. The tb germ is unique in producing d-arabinose.

This sugar by itself is harmless, but the tb germ combines it in a peculiar way with other harmless sugars to make its own complex sugar that is deadly poison to a tuberculosis-infected animal.

These findings of Dr. Anderson's pertain not only to the germ of human tuberculosis. There are other, related germs that cause tuberculosis in cattle and in birds. A third relative of the tb germ is a harmless organism known as the timothy bacillus. Also related is the leprosy bacillus. Each of these organisms has been analyzed in the same way, and most of the chemicals found in one were found in another, though in varying amounts.

Prof. Anderson is still busy analyzing the tb germs and expects to find more products of its chemical factory. Some may be even more significant.

ARCHAEOLOGY

Jerash Had Traffic Rules And Parking Lot in Forum

IS JERASH mentioned in the Bible? "It is and it isn't," answers Dr. W. F. Stinespring, archaeologist.

Young Dr. Stinespring has been asked that question so many times since he went to dig at ruins of the city of Jerash, or Gerasa, for Yale and the American School of Oriental Research in Jerusalem.

Whether you can find Jerash in the Bible depends on the version you consult, Dr. Stinespring explains. You have to look for the story of Christ healing two men possessed of evil spirits, with the dramatic ending of the spirits entering a herd of swine and running headlong into a lake. In some Bibles it is reported to have happened at Jerash, then called Gerasa. Another version places it 30 miles away at Gadara.

The Jerash of Roman days, about the time of Christ, was a typically Roman planned town—main street lined with columns running one way, and principal cross streets running the other.

There are mysterious ruts in this main street, Dr. Stinespring told the Archaeological Society of Washington, describing the latest finds. In the well-laid Roman paving these deep ruts were worn along the right side of the road—never the left. Traffic rules, whatever they were, evidently were obeyed.

A Parking Lot?

Some of the graceful columns encircling the oval forum of Jerash are still standing. But what the forum was used for, whether a meeting place, market dealings, or official business, is uncertain. One theory has it that merchants, coming over the dusty caravan routes, "parked" their camels in the forum and tidied themselves up before going into town. The stone pavement of the forum is so solid, where it has been uncovered by the archaeologists, that Dr. Stinespring says it would make an excellent parking lot for automobiles.

Jerash had a beautiful and impressive triumphal arch built in honor of the visit of the Emperor Hadrian himself. That visit was a great event. Jerash had a large *circus maximus* like that at Rome, but archaeologists believe this was not finished because of a financial depression.

(*Turn to next page*)

A glimpse of theatrical lighting effects, as they were designed in Roman days, is offered at ruins of a Jerash theater. The plays must have been given in daylight, with little chance for artificial lights, Dr. Stinespring explains. But the stage was built with pink limestone columns, and when sunset spreads rosy colors over this stage, even a person sitting in the wreck of the tiers of seats can imagine the beauty at the close of a performance.

Science News Letter, April 11, 1936

PSYCHOLOGY-PHYSIOLOGY

Brain Waves New Tool for Watching Workings of Mind

Learning Can Be Observed by Psychologist Through Tapping Electric Impulses Direct From Brain

TAPPING of electric potentials, or "brain waves," directly from the brain now gives the psychologist a new tool for the study of what goes on in the mind of man, including the higher thought processes, it is suggested by Dr. Herbert H. Jasper, psychologist of the Emma Pendleton Bradley Home, East Providence, R. I., and Brown University.

If you look at a red light shining in a darkened room and then that light is put out, you will continue to see the light for a time as an "after-image." In the past, psychologists have been able to study such after-images only through the description by the subject of what he saw. Now the brain waves give a new and independent verification.

When nerve impulses go to the brain from the eye or the ear, they do not find a nice quiet group of brain cells awaiting their coming to be set into activity, Dr. Jasper has found.

"These cortical cells seem to have a vigorous activity of their own, but evidently not enough to discourage always the sensory impulses, for they may jump right in and either abolish completely the cortical rhythm or distort it beyond recognition by causing it to behave in a very different manner," he said.

By watching the record of the brain waves, the psychologist can tell when the subject is seeing the light and how long the after-image persists. When a flickering light is used, he can tell exactly how fast the light may flash and not appear to the observer as a continuous beam.

The process of learning may be "watched" in the brain. For example, a faint sound does not ordinarily produce the upsetting effect on the brain waves that is produced by a bright light. But when the faint sound and the bright light are associated together, the faint sound may come to have a similar blocking effect on the brain waves. The psychologist watching the brain wave patterns can tell exactly when this learning, or "conditioning" takes place.

A change in "mental set" of the observer may make the bright light cease to block the brain waves, or it may cause the faint sound to become as effective as the light ordinarily is, Dr. Jasper found.

"Even though we are able to tap only certain aspects of the bioelectric activity of a few cortical regions," he concluded, "we are certainly obtaining an important objective record of the effects of sensory stimulation which bear significant relations to what psychologists have discussed formerly under the rubric of the conscious mental processes."

Thus the brain waves open up an entirely new technique for the scientist who wants to study objectively and scientifically the processes known formerly only by subjective report.

Dr. Jasper recently described the new applications of the brain-wave technique to the New York Academy of Sciences.

Science News Letter, April 11, 1936

In museums of the world there are now 150 of the painted coffins of Egyptians inscribed with religious thoughts 4,000 years old.

The house of the future may have glass walls and marble windows, now that research has developed glass building blocks and marble that is translucent like stained glass.

MEDICINE

Remedy for Cystitis May Come From Insecticide

A LABORATORY-MADE insecticide powder which may turn out to be a valuable remedy for bladder disease was reported to the American Society for Pharmacology and Experimental Therapeutics. The report was made jointly by Drs. Floyd DeEds, John O. Thomas, C. W. Eddy and A. B. Stockton of the U. S. Department of Agriculture and Stanford University Medical School.

The powder, which has the name phenthiazine, was made in the Department of Agriculture laboratories for use as an insecticide. Before it was put into practical use for this purpose, it was tested on animals to determine whether it was poisonous. Its effect on these animals indicated a possible use as a urinary antiseptic.

Rabbits suffering from cystitis or bladder inflammation due to infection with colon bacilli were cured by the addition of small amounts of the powder to their diet.

Encouraging Results

Encouraging results in about thirty human cases of chronic cystitis were obtained with phenthiazine. In these thirty cases every kind of treatment had failed to relieve the condition. With proper scientific caution, however, the investigators point out that the new antiseptic is still in a very experimental stage and far from being ready for general application in the treatment of human disease.

A plentiful supply of the antiseptic will be available as a result of laboratory synthesis made recently.

Science News Letter, April 11, 1936

PSYCHIATRY

New Organization To Study Suicide

THE CAUSES and ways of preventing suicide will be the subject of study by an organization just chartered in New York State, according to an announcement in the professional journal, *The Psychological Exchange*. The organization is aided financially by Marshall Field and others. It has a staff of seven psychiatrists and two social workers who will make researches and spread information on this subject.

Science News Letter, April 11, 1936