tremely short ultraviolet radiation, which is beyond the limit of reflectivity of silver. At the suggestion of Prof. S. L. Boothroyd of Cornell, two graduate students in physics, Robley Williams and George Sabine developed a German method of depositing metal film on glass and applied it to the coating of astronomical mirrors.

Last year a 10-inch mirror was chromium coated and used at Cornell's Fuertes Observatory to photograph the star Vega's spectrum in the extreme ultraviolet, in which region silver just allows the radiation to pass through without reflecting it.

This year Lowell Observatory loaned a 15-inch mirror and a 4-inch secondary which were coated with aluminum and a Cornell party used them and other aluminum-coated mirrors and quartz spectrographs at Lowell Observatory, Flagstaff, Ariz., to photograph nearly 200 extreme ultraviolet spectra of over 80 typical stars. The Cornell party, which consisted of Prof. and Mrs. S. L. Boothroyd, Mr. and Mrs. H. C. Ketcham, R. W. Shaw, Robley C. Williams and George B. Sabine, worked during September and October at Lowell Observatory's mountain station at 11,500 feet altitude as well as at Lowell Observatory, at 7,350 feet altitude.

Analysis of the spectrograms obtained, now in progress, is expected to give new information about the temperature and condition of the star.

Science News Letter, December 30, 1933

GEOLOGY

Crack in Earth Indicated By Radioactive Water

RADIOACTIVE water, captured by geologists in wells dug by farmers in Michigan, disclosed the existence of a fault, or crack in the earth's deepest rocks, although it was masked by a thick overlying layer of earth. At the meeting of the American Association for the Advancement of Science, Prof. Alfred C. Lane and Dr. W. R. Bennett, of Tufts College, told how it was done.

Water samples, collected and rushed to Purdue University for analysis, showed varying degrees of radioactivity; the closer to the fault the wells, the more active the waters. This was because radioactive substances from deeper within the earth's crust were rising through the crack and charging the water.

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MECHANICS

Scientists and Housewives Test Bottle-Top Unscrewing

EVER TRY to screw off a bottle top that refused to be unscrewed?

If so, you will sympathize heartily with a piece of research at the Pittsburgh Testing Laboratories. Calling on housewives with varying degrees of muscle to aid in the test, the laboratory has gone very thoroughly into the question of just how much strength manufacturers can expect the customers to exert on a bottle top.

"The twisting effort that a woman can exert in unscrewing a cap is strictly limited," reports the laboratory director, M. L. Carr, in the trade journal *Food Industries.*

The weakest-armed woman exerted a twisting force of only 11.6 inch-pounds, while the strong arm of the strongest woman twisted with a force of 29.6. The average housewife naturally came well between these extremes with a power of 18.5 inch-pounds.

One jar of sandwich spread which proved immovable—even when the housewife gave up twisting it and took to hitting, prying, and heating the bottle—was given a laboratory test. Screwing it off required 102 inch-pounds of twisting effort.

The actual test consisted of taking ten different unopened bottles and jars of grocery goods into the housewife's own kitchen and asking her to open each by unscrewing the lid. If she failed, she was told to go ahead and open it any way she liked, and the laboratory found this meant anything from banging the bottle on the floor to calling in a husband. Incidentally, some jars baffled even the husband. The experiment was repeated in fifty kitchens, with 500 bottles and jars altogether put to the kitchen test.

Out of the test emerges the information that the way in which a cap is applied to a bottle in the factory may be one important factor in the opening process. Some caps are "rolled on." That is, the threads are rolled into the cap over the threads of the container. Other caps are "preformed." These caps have their screw threads formed separately from the container, but designed to fit the container threads.

Of the 96 bottles and jars that proved unscrewable in the hands of the housewives, 56 were removed by some rough-and-ready device, and the remaining 40 defied all efforts. Of these 40 only two were rolled-on screw caps, says Mr. Carr's report, whereas the other 38 were preformed caps.

The plight of the weakest women who have to tackle the bottle cap problem is pronounced indeed sad. About half of the bottle caps are beyond their strength. But when even the powerful Katrinkas give up the struggle with a bottle, manufacturers may well pause to take thought on the bottle-top question.

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MEDICINE

Immunity to Disease Measured in Tissue

WHEN an animal is given immunity to disease germs, its skin and other tissues acquire protective properties as well as the blood, in the opinion of Prof. Reuben L. Kahn of the University of Michigan.

At the meeting of the American Association for the Advancement of Science Prof. Kahn reported a method of measuring the degree of immunity acquired by the different tissues of the body. He pointed out that if it is possible in this way to learn the extent of immunity of all the tissues of an animal, medical scientists will be able to fight germ diseases more successfully than at present.

Prof. Kahn's studies showed that when an animal is immunized its body tissues acquire a new property; namely, the capacity to detect and to anchor or combine with the immunizing substance whenever they come in contact with it.

The protective nature of this tissue change is evident, since by combining with the substance against which the animal is immune, the tissues prevent its diffusion or spread throughout the body. In the case of infections, this capacity of the tissues may determine whether the germs will spread throughout the body and produce widespread