



**RUST-CONTROL STUDY**—Progress and destructive effect of the radioactively-coated rust patch being pointed to by the tweezers will be revealed on a photographic plate to be placed over the metal. The Geiger counter, glass tube above the metal square, picks up the radiations.

## DENTISTRY

## New Tooth Decay Theory

Those cavities in your teeth may be due to bacterial enzymes which release sulfuric acid from the protein in teeth, English scientist suggests.

A NEW theory that sulfuric acid in your teeth causes cavities when it is set free by chemicals unleashed by germs has been proposed by an English scientist.

Dr. P. Pincus of the physiology department, Medical School, Middlesex Hospital, writing in the *BRITISH MEDICAL JOURNAL* (Aug 13), explains that in enamel and dentine, the bone-like tissue below the enamel, is a protein containing sulfuric acid. Germs known as Gram-negative bacilli are present in the mouth, and secrete an enzyme called sulfatase. Chemical reaction between tooth protein and the enzyme sulfatase releases the pure sulfuric acid which then attacks teeth and causes decay, the theory holds.

In support of his new theory, Dr. Pincus points out that there are tiny grooves or cracks at the tips of teeth. When teeth first erupt they are covered by a fine layer of protein. This is worn off on the crowns by eating but since the cracks are narrow it remains in them. This site is thus a very favorable place for the chemical reactions to take place. Previous experiments have

proved that the grooves are the most common place for decay to start.

A crack in the enamel-armor of the teeth which is not completely closed would be a minute avenue of entrance for bacteria to the dentine. Here the same chain of events could occur by the formation of bacterial enzymes reacting with the store of protein inside the tooth to burrow from beneath and cause decay.

Dr. Pincus refutes the idea that lactic acid formed by bacterial action is responsible for this decay at the bottom of the groove. Even if food particles are deposited in these grooves and thus form the site for lactic acid formation, the decay would occur on the sides of the groove rather than at the bottom because this has a plug of protein protecting it.

He concludes that tooth decay is not due to any bacillus but to certain bacterial enzymes which can release the sulfuric acid from the protein in teeth. Further study is needed to find out how the bacilli produce these enzymes and make them active.

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## ENGINEERING

## Rust Problems Studied With Radioactive Isotopes

► THE iron rust problem is being tackled by General Electric scientists with the help of radioactive isotopes from the Oak Ridge, Tenn., laboratories. The rusting action is photographed by X-rays from a radioactive surface.

In the study, a solution containing radioactive iron is electroplated onto the surface of the metal to be examined. Then a photographic plate is placed against this surface and left for several days. During this time, an X-ray exposure is made on the plate by the radioactive coating. As the test metal rusts, a decrease in radiation results, showing up graphically on the photographic plate as lighter areas.

By taking a series of these pictures, called autoradiographs, the scientist can see photographically the nature of the rust forming on the test metal. It is expected the photos will help show how rust starts, where it starts, and how deep it goes.

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## CHEMISTRY

## England Wants To Improve Detergents from Petroleum

► WITH the use of cleansing synthetic detergents from petroleum firmly established in the British textile and other industries, intensive studies are to be continued in that country with the objective of developing better products and methods. The results will help relieve the world shortage of vegetable and animal fats for soap.

British work in making these detergents was explained to the United Nations Scientific Congress on the Conservation and Utilization of Resources, held this month at Lake Success, N. Y., by F. Mackley, Shell Refining and Marketing Co., Ltd., Cheshire, England. He reviewed the petroleum refining industry in the United Kingdom, showing the predominance of specialized refining for lubricating oils and bitumens as well as detergents.

There is little crude oil mined in England, although the so-called Eakring field has reached a production of some 70,000 tons a year. This crude yields high quality lubricating oil and wax distillates.

Crude oil, however, is imported in quantities of several million tons annually and refined in domestic plants. The industry is currently dominated by the very considerable expansion of general refining facilities which is now taking place, according to Mr. Mackley. Certain refineries are to devote their activities to petroleum chemicals, including aliphatic alcohols and ketones, acetone, glycols, aromatic hydrocarbons, solvents and plastics.

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