ing the ingestion of certain carbohydrates.[2] However, the pH of these "plaques" was found to rise to normal (6.0 to 7.0) within 20 to 60 minutes. Previously, the saliva has been thought to neutralize the acid "plaques" on tooth surfaces by virtue of the buffers it contains when secreted from the salivary glands.

Now, however, it has been discovered that in addition to the secreted buffers, the urea in saliva is converted to ammonium carbonate, locally on the tooth surface by the action of certain urease-containing bacteria (such as staphylococcus albus and aureus) which grow on the tooth surface in the bacterial "plaque." This ammonium carbonate neutralizes some of the acids which might otherwise produce caries activity. The urease is present in the bacteria as an endo-enzyme, and is not dissolved in the saliva. Some mouth bacteria, such as certain strains of lactobacilli, have been found to contain no appreciable urease; thus these bacteria not only increase caries activity by the fermentation of carbohydrates to lactic acid, but they also fail to retard caries activity by the conversion of urea to ammonium carbonate.

The pH of bacterial material on tooth surfaces and in cavities has been found to rise as high as 8.5 following rinsing the mouth with a carbamide (synthetic urea) solution. Calcium phosphate tends to be deposited on the tooth from the saliva instead of being dissolved from the tooth at this pH (8.5). Solutions of carbamide, used in conjunction with a tooth brush, have been found to be effective in cleaning teeth, and clinical observations have indicated that the treatment may be of value in some cases of gingivitis and pyorrhea.

Long-term studies of patients with caries and other dental diseases are now being conducted (1) using compounds containing carbamide as a dentifrice or mouth wash; (2) by inoculating the mouth with nonpathogenic urease-containing bacteria; and (3) by a combination of the two agents. These studies promise to shed new light on the causation and prevention of caries and to furnish a new treatment for gingival and periodontal diseases.

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SIGNIFICANCE OF DISSEMINATED METALLIC SULPHIDES IN SEDIMENTARY ROCKS

IN a recent issue of SCIENCE (September 20, 1940) Karl Ver Steeg refers to the presence of small amounts of sphalerite and galena in Mississippian and Pennsylvanian strata of Ohio and suggests that "these occurrences may have some value to students interested in the theories of the origin of sphalerite and galena ores such as those of the upper Mississippi Valley."

In an article entitled "The Geodes of the Keokuk Beds," published in 1916,[1] the writer pointed out the existence of sphalerite, chalcopyrite and even of millerite (NiS) in geodes at certain stratigraphic horizons of Mississippian age in southeastern Iowa and adjacent areas in Illinois and Missouri. The text contains the statement that the occurrences "promise to throw some light upon the origin of more important deposits of these minerals in sedimentary rocks showing no signs of igneous influence."

This note is not intended to detract from Ver Steeg's contribution but rather to supplement his remarks and to call attention again to the possible significance of such information in connection with the problem of origin of the Mississippi Valley lead and zinc ores.

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VITAMIN STUDY AT THE UNIVERSITY OF TEXAS

THROUGH the generosity of the Clayton Foundation of Houston, we have recently been able to expand our research program under the designation of the Biochemical Institute. Work already under way is being supported by the Rockefeller Foundation and the University of Texas.

Members of our research staff have pioneered in the publication of microbiological methods for the determination of riboflavin, pantothenic acid and biotin (vitamin H). Alternate methods for these and similar assay methods for other vitamins have already been devised or are in process of development.

In the expanded program it is planned, in addition to continuing investigations in progress, to apply these methods to the study and assay of animal tissues of numerous types, including embryonic tissues and tumors. The relationship of these results to the problems of metabolism will doubtless be complicated, and we do not believe anything short of a thorough study can yield results which are significant and capable of interpretation. We are fortunate in being in a position to carry out such an extended study.

Recently added members of the full-time staff include Dr. Alfred Taylor, research biologist; Dr. Maxwell A. Pollack, research chemist; Misses Ernestine Quarles, Margaret Jane Hofer and Juanita Thacker, technical assistants. Additional appointments will be made as the work progresses.

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THE QUININE INDUSTRY

SINCE the invasion of Holland on May 10, there have been persistent rumors of Nazi attempts to inter-

[1] *Am. Jour. Sci.*, (4) 42: 34–42, 1916.

[2] Robert M. Stephan, *Jour. Am. Dental Asn.*, Vol. 27, pp. 718–723, May, 1940.