## Fermentative Capacity of Lactobacilli from Carious Lesions

In W. G. Shafer's paper on the capacity of starch, glucose, and sucrose to produce dental caries in the hamster (*Science*, 1949, 110, 143) it is interesting to note that sucrose was found to be the most caries productive of these three carbohydrates and that there seemed to be a direct relationship between caries productivity and solubility of the substances tested.

If we accept, at least tentatively, the postulation that acidogenic microorganisms play an etiological role in the dental caries process, it might be highly pertinent to know the fermentative capacities of bacteria associated with and isolated from carious lesions. From unpublished data of a few years ago, it can be stated that lactobacilli found to predominate in the oral cavity of hamsters with dental caries almost all fermented glucose and sucrose equally well, but not starch preparations. Many strains of lactobacilli isolated from the human oral cavity showed similar fermentation reactions, but some strains from non-oral sources definitely showed a preference for the monosaccharide, whereas starch was rarely fermented by any lactobacilli.

Dr. Shafer's results in hamsters are somewhat similar to the findings in rats as observed by Gerald J. Cox and others. Despite the significance of such findings, they apparently cannot be explained on the basis of the biochemical capabilities of some of the bacteria associated with the dental caries process.

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## The Agricultural Impasse

Last summer the *Congressional Record*, at the request of Congressman Fred L. Crawford of Michigan, reprinted the first part of W. Gordon Whaley's able article on "The Agricultural Impasse" (*Science*, 1949, 110, 81). Congressman Crawford's remarks on the remainder of this article provide highly pertinent comment on the supposition that agriculture is a "bottleneck" that can be relieved by the biological equivalent of a "Manhattan Project," or "District." It is to be hoped that these remarks, which I quote, may produce, relative to Congress and the government budget, more scientific humility and less political and economic naivete among scientists.

Dr. Whaley . . . then turns to an extensive consideration of Congressional support for plant research in the hope of removing the "impasse" between the "efficiency" of industry and of agriculture.

We should beware, however, of the idea that the land can be made into an "endless frontier" by science; for nature is no nest of safe deposit boxes awaiting the pleasure of Congress in fostering research to unlock their secrets and enable us to draw sustenance for an indefinite expansion of population. It is not possible that "the science of handling the land and its plants and animals" can afford an "alternative to the age-old unbalance of . . . the haves and have-nots, and the birth of countless millions of human beings to the misery of inadequate food," unless those births are restrained instead of encouraged by social measures.

Except for irrigation, for which the opportunity is nowhere very extensive, man's culture of plants has generally reduced the pristine photosynthetic capacity of the earth's plant cover in order to attain what Dr. Whaley calls "fine goods" that can be eaten. Restoring some measure of this primitive capacity by scientific agriculture is feasible. But to match the harvesting capacity of our modern, mechanical Frankenstein by an equally expansive biological technology is to deal in Brobdingnagian fantasies. "Unraveling the facts of growth, development, and reproduction" can hardly outstrip the work of countless generations of biological evolution by utilizing anything which that evolution has made possible in plant growth. When, if ever, man does succeed in outstripping the productive capacity of vegetable life, he will have to by-pass and displace plant life by himself becoming, in effect, a plant species through the development, not of biological, but of physical, science. Until then the farm will remain, as it now is, just a farm and not a factory.

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## Note on the Protective Action of Diparcol against Lethal Doses of Nicotine

C. Heymans and J. J. Estable (*Science*, 1949, **109**, 122), reporting on the nicotinolytic activity of N-diethyl-aminoethyl phenothiazine (diparcol), stated that 15–30 mg/kg of this material, injected intravenously into dogs under chloralose anesthesia, gave complete protection against 100–200 lethal doses of nicotine. More recently, the details of this study have become available (Heymans, C., Estable, J. J., and Castillo de Bonneveaux, S. *Arch. int. Pharmacodyn.*, 1949, 79, 185) and it appears that the statement cited was based on a value of 0.1 mg/kg of nicotine salicylate as the single lethal dose of nicotine.

If this is truly the lethal dose for nicotine under the conditions of the experiment, it would appear that the morphine-chloralosane anesthesia used increases the lethal effect of nicotine by 100 to 200 fold. Other investigators have found the lethal dose of nicotine alkaloid to be about 3 mg/kg in unanesthetized dogs (Franke, F. E., and Thomas, J. E. *Proc. Soc. exp. Biol. Med.*, 1932, 29, 1177), about 5 mg/kg in dogs under ether (Thomas, J. E., and Franke, F. E. *J. pharmacol. exp. Therap.*, 1928, 34, 111), and 5 mg/kg in dogs under Dial (Larson, Paul S., Finnegan, J. K., and Haag, H. B. *J. pharmacol. exp. Therap.*, 1949, 95, 506).

Our experience with 30- to 40-mg/kg doses of diparcol (samples kindly furnished by Merck & Co. and Parke, Davis & Co.) in dogs anesthetized with ether or Dial is that it will not protect against the lethal effect of 10 mg/kg of nicotine (2 lethal doses under these conditions).

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