more resistant to tooth decay than those subjected to fluorine only after tooth development was complete. The reason for this difference is not known.

Summary. Some inhibition of caries resulted when 45, 90, or 135 p.p.m. of fluorine were ingested as supplements to a sucrose basal ration. Depigmentation of the incisors appeared when 45 or more p.p.m. of fluorine were incorporated in the diet while mottling of the third molars occurred when 225 or more p.p.m. were fed. The ingestion of 225 or 450 p.p.m. of fluorine caused a 90% decrease in caries incidence. Thus the amount of fluorine necessary to inhibit caries to this degree was sufficiently high to cause mottling of the developing teeth.

The inhibitory effect of dextrin upon caries development could not be explained on the basis of its fluorine content.

14993

The A-V Conduction System in the Heart of the Guinea Pig.

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The importance of the conducting system in the heart is attested by increasing numbers of references to its structure and function.[1,2,3] Methods of study have involved gross dissection, injection with opaque substances, and histologic studies of serial sections of the heart.

The present work consists of a study of serial sections of young guinea pig hearts stained with Goldner's modification of the Masson trichrome technic.[4] The conducting tissue stains a purplish gray, the myocardium is brick red, and connective tissue is a bright green. In the guinea pig heart, there is not the slightest difficulty, even under low power of the microscope, in distinguishing A-V conducting tissue from ordinary myocardial tissue. Fig. 1 shows the clear-cut distinction between bundle tissue (B) and myocardial tissue (SE) of the interventricular septum. Under high power, the nodal and bundle cells are of the Purkinje type. The A-V node lies in the posterior part of the interatrial septum, as it does in other mammals. The main bundle and its right and left interventricular septal branches can easily be followed through the serial sections to their peripheral connections. The distribution of the right and left septal branches is similar to that described for other hearts. However, in this heart there are additional interventricular septal branches, one of which is shown in Fig. 1 (S). These additional branches descend directly from the main bundle. There are also connections to the septal muscle from proximal as well as distal parts of the right and left bundle branches.

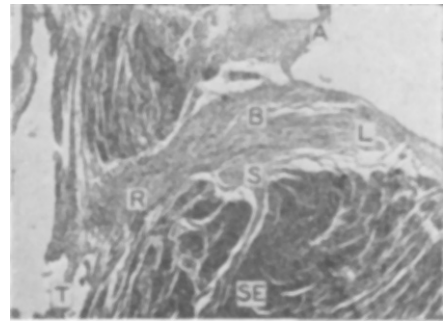

FIG. 1.
Photomicrograph of the main bundle (B) of the A-V conducting system, the septal branch (S), and the beginning of the right (R) and left (L) bundle branches in the interventricular septum (SE) of the heart of a young guinea pig. Semilunar valve of aorta (A), tricuspid valve (T). Frontal section, 10 μ thickness, Masson's trichrome stain.

These muscular connections of conducting tissue may have considerable significance with regard to analysis of function of heart muscle.

1 Ashman and Hull, *Essentials of Electrocardiography*, 1941, p. 28, 51, 69.

2 Bayley, R. H., *Am. Heart J.*, 1943, **26**, 769.

3 Nonidez, J. F., *Am. Heart J.*, 1943, **26**, 577.

4 Goldner, J., *Am. J. Path.*, 1938, **14**, 237.

The electrocardiogram of a guinea pig is very similar to that of other laboratory animals. Therefore analytical studies of electrocardiograms must consider more carefully than heretofore the anatomical patterns of the conducting system.

Summary. In the guinea pig heart, the A-V conducting tissue is readily differentiated under the microscope from the myocardial tissue. The distribution of the right and left branches of the A-V bundle is similar to that described for other mammalian hearts. In addition there are other septal branches in this heart which are not seen in most mammalian hearts. The significance of these findings is pointed out.

14994

Vaccination with Various Western Equine Encephalomyelitis Viruses; Comparison as Antigens and as Test Inocula.*

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Vaccination of mice and guinea pigs with various strains of Western equine encephalomyelitis (W.E.E.) virus, carried out recently in this laboratory, induced a satisfactory degree of immunity to all except the current Rockefeller Institute (R.I.) strain. Indeed, mice immunized with the latter to such a degree as to show immunity to other W.E.E. viruses, failed to resist comparable amounts of the homologous R.I. strain.

Sabin reported[1] earlier that certain strains employed in his laboratory may possibly have different antigenic constitutions. Hammon cited[1] experiences similar to ours with respect to the use of current R.I. strains in challenge tests for immunity.

A study was undertaken to determine whether the various strains of W.E.E. virus which were available showed immunological differences; as a corollary, to select strains best suited not only for preparation of vaccines but also for use as standard in challenge tests for induced immunity.

The W.E.E. strains of the present investigation comprised the following:

The *R.I.* strain was obtained in 1933 from Miss B. F. Howitt, then at the George Williams Hooper Foundation, San Francisco. Since that time it has undergone frequent intracerebral passages in mice at the Rockefeller Institute. Three samples were available, hereafter referred to as (a) "R.I."—the virus currently used; (b) "R.I. 1939"; and (c) "R.I. 1941," the dates referring to the year in which the strains were frozen and kept so until required for use as fresh virus when an occasional mouse-passage was made.

The *Lederle* strain was sent to us in the form of guinea pig brain on Sept. 8, 1943, by Miss F. L. Clapp of the Lederle Laboratories, Pearl River, N.Y. It was in the 2nd guinea pig passage and had ultimately been derived from horse brain obtained by the Lederle Laboratories from the Bureau of Animal Industry.

The *Mosquito* strain was received as a mouse-brain passage of Strain F-199, on Oct. 19, 1943, from Dr. Hammon of the Hooper Foundation. It had been isolated by Dr. Hammon from *Culex tarsalis* in the Yakima Valley, Washington.

The *Kelser* strain was sent by Brigadier General R. A. Kelser, Chief of the Veterinary Division, U.S.A., to Dr. C. TenBroeck, who offered it to Dr. J. Zichis of the Illinois Department of Public Health, Chicago, and he in turn gave it to us in 1942. The strain has undergone many guinea pig passages and

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[1] By personal communication.