would thus be improper to infer that one type of fiber always performed the same function everywhere in the body, and no such claim has been presented. On the other hand, the demonstration that stimulation of fibers with one set of properties has sensory effects determined mainly by their central connections, leaves the alternative proposed by Blair and Erlanger at best a subsidiary one, and leaves it possible for physiologists to adhere with some degree of fortitude to the doctrine of specific nerve energies.

6909

Asphyxia of the Frog's Kidneys.

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Urine formation was measured in normal frogs by repeatedly weighing individuals whose cloacae were bound for a known period of time and later unbound. It was observed that in the absence of oxygen no urine formed. Even when diuresis was favored, by subcutaneous injection of water or 1% urea solution, no urine reached the bladder. When the breathing was interrupted by appropriate pithing or anesthesia the same inhibition of urine formation occurred, provided the frogs were kept at temperatures (20° to 27° C.) high enough so that oxygen was not adequately supplied to the blood through the skin. After 2 hours of asphyxia, anuria persisted for 1 to 4 hours, until such time as the frogs resumed breathing. As the frogs recovered, extra urine was formed until the initial net body weight was reestablished. The heart's circulation was maintained throughout. Two alternatives presented themselves: did (glomerular) fluid cease to form, or was the fluid that formed completely reabsorbed (by the tubules)? If no fluid formed was the circulation inadequate, or was oxygen indispensable for the excretion of water?

The exposed kidneys were examined in pithed frogs that were lying in a closed gas chamber. Blood invariably ceased to flow through the glomeruli within 1 minute after deprivation of oxygen. Often the glomeruli emptied completely of blood, and the whole kidney became paler. No corpuscles and hence presumably no plasma flowed through the glomerular capillaries until 1 minute

after oxygen was again supplied to them. A relatively low concentration of oxygen was adequate to maintain glomerular circulation in the exposed kidney. Portions of the kidneys other than the glomeruli continued in the absence of oxygen to receive a copious supply of blood, and it is believed that the asphyxia exerted its peculiar effect because of the special nature of the glomerular circulation.

6910

Variations in Calcification of Teeth as Shown by the Use of Grenz Rays.*

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Dental decay may be closely related to disturbances in calcium-phosphorous metabolism. There has been little evidence to indicate the mechanism by which such systemic factors operate on the fully erupted tooth. One possibility in this connection is that the tooth can undergo post-eruptive changes in calcification in response to such systemic changes. To determine whether such intradental changes do occur, Bodecker and Applebaum[1] made roentgenological study of teeth in ground section, 1 mm. thick. The radiation was obtained from an X-ray machine which operates at about 40,000 volts. By this method, only gross differences in radiolucency were recognizable—such as that between dentin and enamel, or the partial decalcification associated with a lesion of incipient caries. In no case was it possible to distinguish any minute structural detail. Similar results have been obtained by Heiwinkel.[2]

Recently, Fricke[3] found that excellent radiographs of insects can be obtained by means of soft X-rays (Grenz or Boundary rays). He employed a specially constructed X-ray tube which operates at potentials as low as 4,000 volts. With the generous cooperation of Dr. Fricke, we were able to examine several thin sections of teeth with his apparatus. Since minute structural variations in teeth

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1 Bodecker, C. F., and Applebaum, E. A., *Dental Cosmos*, 1931, **73**, 995.

2 Heiwinkel, M., *Vierteljahrsschrift für Zahnheilkunde*, 1932, **48**, 247.

3 Fricke, H., *Radiography and Clinical Photography*, 1932, **8**, 12.