pound dermal structures as mesectoderm inductions, derived from a modification of a fundamental structure resembling the present toothbud. Enamel is thus considered a phylogenetically old material rather than a recent invention. Moss elaborated this hypothesis and commented on such implications as the essential homology of the keratinized beak of turtles to the external portions of teeth; both were derived by modifications of the enamel organ. Amino acid analysis was stated to have established the homology of mammalian enamel, shark (denticle) enamel, the elastoidin of dermal fin rays, and the ichthylepidin of teleost scales. All are ectodermal collagens.

The active discussion elicited the comment (by Moss) that conodont fossils should, on morphologic and crystallographic grounds, be considered of nonvertebrate origin.

Robert A. Robinson (Johns Hopkins) discussed the results of studies in the ultrastructure of hard tissues. He showed that the nature of the bone matrix exhibits recognizable quantitative but not qualitative differences between most forms (differing on the family level) yet checked for this point. Analysis suggests that the osteoblasts produce a hydrated collagen fibril matrix that appears to achieve a characteristic ratio of mineral plus residual (that is, bound) matrix water to organic matter when mineralized. Distinctive ratios are obtained from hard tissues deposited on the collagen matrices formed by epiphyseal cartilage cells and odontoblasts. Calculations indicate that mineral exchange in the living animal could occur along the exposed interior surfaces of the marrow canal, the osteocyte spaces, and the canaliculi. This diffuse distribution might satisfy the mineral homeostatic needs of the animal without necessarily requiring exchange at "hot spots." "Hot spots" represent regions of very high water and low mineral content.

The studies confirm the transformation of osteoblasts into osteocytes, but as yet cannot refute the argument that osteoclasts could be alternate modifications of a primitive cell rather than manifestations of the same cell in different phases of metabolic activity.

In discussing aspects of the blood-bone continuum, Marshall R. Urist (U.C.L.A.) interpreted the physiological function of hard tissues to be one of storage. Calcified areas and body fluids then are tied into a single feedback cycle. He supported this with data derived from comparisons of vertebrate groups in general and of related fishes inhabiting marine and freshwater environments in particular. Calcification is believed to have arisen in fresh or brackish waters and to have served both as a storage reservoir that permitted some ionic independence and as a supporting-protecting structure. Any diffuse or localized calcification would serve for ion storage, but distinct mechanical presence of calcification was required for structural functions.

Carl Gans (State University of New York at Buffalo) was chairman of the meeting and Warren F. Walker (Oberlin) organized the symposium. Discussant was Bobb Schaeffer (American Museum of Natural History).

CARL GANS

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Forthcoming Events

April

21–24. American **Geophysical Union**, Washington, D.C. (AGU, 1515 Massachusetts Ave., NW, Washington, D.C.)

22–24. Institute of **Electrical and Electronics Engineers**, 16th annual southwestern conf., Dallas, Tex. (F. E. Brooks, Jr., Military Electronics Div., Ling Temco Vought, P.O. Box 6118, Dallas 75222)

22–24. British Inst. of **Radiology**, 25th congr., London, England. (British Institute of Radiology, 32 Welbeck St., London, W.1)

22–25. National Council of **Teachers of Mathematics**, Miami Beach, Fla. (H. T. Karnes, Dept. of Mathematics, Louisiana State Univ., Baton Rouge 3)

23–25. American **Gastroenterological** Conv., Philadelphia, Pa. (C. E. Nelson, 313 N. First St., Ann Arbor, Mich.)

27–1. **Photographic Science and Engineering**, intern. conf., New York, N.Y. (W. Clark, Eastman Kodak Laboratories, Rochester, N.Y. 14650)

28–1. Dallas-Southwest **Industrial Trade** Fair, Dallas, Tex. (C. L. Wells, P.O. Box 26010, Dallas 26)

29–1. **Acoustical Fatigue**, 2nd intern. conf., Dayton, Ohio. (D. M. Forney, Research and Technology Div., U.S. Air Force Systems Command, Wright-Patterson Air Force Base, Dayton)

29–2. **Peaceful Uses of Space**, 4th natl. conf., Boston, Mass. (G. A. Rogovin, 501 Boylston St., Boston 16)

29–2. American **Thyroid** Assoc., annual, Rochester, Minn. (T. Winship, ATA, 110 Irving St., NW, Washington, D.C. 20010)

30–1. Institute of **Hospital Administrators**, annual, Edinburgh, Scotland. (IHA, 75 Portland Place, London, W.C.1, England)

30–1. **Zonal Centrifugation Systems**, Oak Ridge, Tenn. (F. C. Von der Lage,