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10. ALTERATION OF TOOTH FORM IN THE RAT BY THE PREERUPTIVE DIET. Gerald J. Cox, Ph.D. and Margaret Matuschak Levin, B.S. in Chem., The Nutrition Fellowship of The Buhl Foundation, at Mellon Institute, Pittsburgh, Pa. Rats were fed, from the beginning of pregnancy, 2 general types of diets: Type A. Casein, 20; sucrose, 66; Crisco, 10; Osborn and Mendel salt mixture, 4, or its equivalent without calcium and phosphorus or with double the normal content of these elements. Type B, Lean beef, 90; beef liver, 10; additions of calcium carbonate and haliver oil or both. The young were weaned at 21 days and placed on the Hoppert, Webber and Canniff simplified caries-producing diet for 8 weeks. It was discovered that the fused cusp areas of Cox, Dodds, Dixon and Matuschak (J. D. Res., 18: 469, 1939) varied in the extent of fusion. In rats from the Type A rations in Areas 3 and 4, for example, the cusps were fused in 65% of the cases in 91 rats observed. In rats from the Type B rations, fusion occurred in 10% of the Areas 3 and 4 in 197 rats. Cusp fusion was unrelated to the calcium, phosphorus and haliver oil contents of the rations. The factor of differential attrition by the post-weaning ration is not excluded in this study whose object was the observation of caries. Examination of the teeth of rats at 21 days of age, following varied rations fed to the mothers, provides a means of study of the elimination of a fissure between cusps of the rat molar that may be related to the fissures of the human tooth.