

breeds. It was concluded that unless some unknown environmental condition or conditions were operative, the differences in litter-size of the different breeds were largely dependent on hereditary factors.

## 7508 C

### Changes in Caudal Bones of the Rat as an Index of Ossification.\*

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The conventional method of determining the rachitic condition of a rat by either the X-ray or the "line test" method has been restricted primarily to an examination of the longer bones of the rat's body, especially the proximal end of the tibia or distal end of the femur. While a study of the structural changes in such bones furnishes a reliable index of the degree of rickets manifested by the animal in question, a comparison of X-ray photographs of the whole body of such animals indicated that other bones of the skeletal framework might offer some advantages over the tibia and the femur in this respect. This appeared to be especially true of the bones of the tail. This particular body structure appeared to offer a series of provisional zones of calcification which could be studied by either the X-ray or the "line test" method. In fact the tail of the rat had been found to be both more easily and more effectively X-rayed than was the leg and, in addition, it afforded possibilities of removing portions of the bony segments for "line test" during the course of the experimental period, without serious consequence to the health and well-being of the experimental animal.

In connection with another investigation being carried out in this laboratory in which a large number of rachitic animals were being involved, a comparison was made of the X-ray and the "line test" findings, where both the tibia and the caudal bones were considered. A general idea of the comparative results obtained may be had by observing Plates 1 and 2, which were obtained from X-rays and "line test" photographs of the bones of 6 typical animals that represented various stages of ossification.

Animals 0 to 4 inclusive were placed on a rickets-producing diet when 21 days of age. At this time their weights ranged between 40

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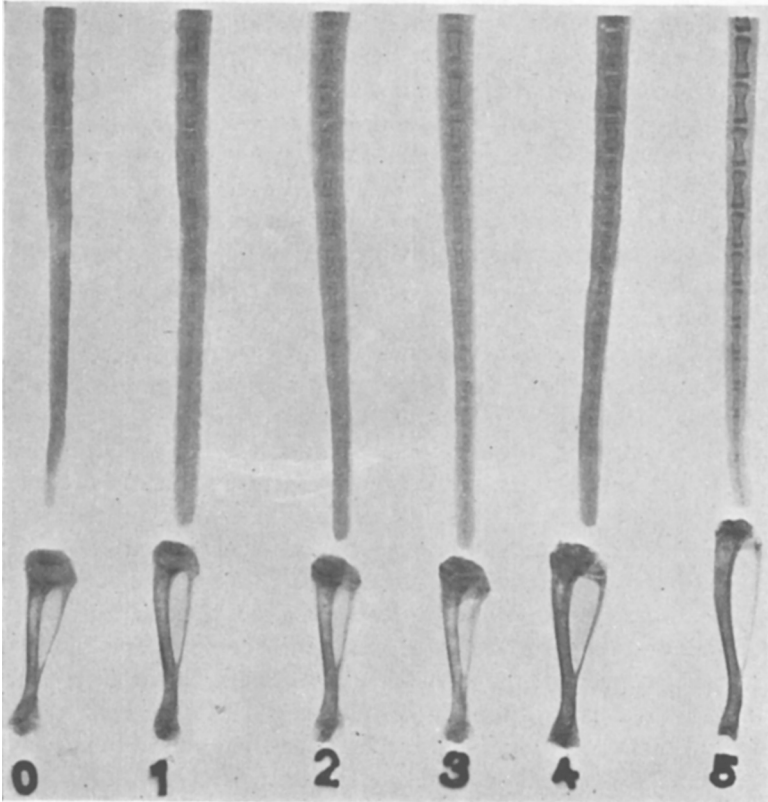


PLATE 1, showing X-ray photographs of both the tibiae and the tails of 6 typical animals, each representing a different stage of ossification.

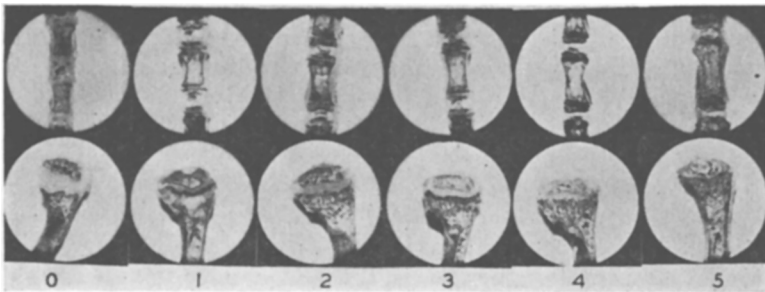


PLATE 2, showing photographs of "line tests" on a tibia and a section of the caudal bones taken from each of the 6 animals considered in Plate 1.

and 46 gm. After being on the rachitogenic diet for 21 days, animal 0 was killed as a negative control, while the 4 remaining animals received one unit (A.D.M.A.) of vitamin D daily as a supplement to the rachitogenic diet. Animal 1 was killed on the 31st day,

animal 2 on the 35th day, animal 3 on the 38th day and animal 4 on the 42nd day. Animal 5 was taken directly from the breeding colony and was 54 days of age when killed.

The tibia and the tail were removed from the dead animal and preserved in a 50% alcohol-water solution until the desired photographs could be made. For the X-ray photographs, the 6 tibiae and the 6 tails were arranged above a single X-ray photographic plate and X-rayed simultaneously. For the "line test" photographs, the bones were prepared in the usual manner and individual photographs were taken.

Through such photographs and other observations, we are led to believe that both X-ray and "line test" made of the caudal bones of the rat are reliable indices of the degree of ossification. The caudal bones appear to offer some advantages over the tibia or the femur in certain respects, but do require greater pains in the preparation for "line testing" than does either the tibia or the femur. Some of these advantages are: (a) the caudal bones are both more easily and more effectively X-rayed, (b) the caudal bones offer a series of zones of calcification instead of a single zone, and (c) the caudal bones offer possibilities of removing segments for "line test" during the progress of the experiment. While such advantages may be important considerations in certain phases of research, it is not suggested that the caudal bones replace the tibia or the femur in the conventional method of determining the state of ossification.

## 7509 C

### **Formation of Bone by Periosteum After Experimental Infarction by Embolism of Femur in Rabbits.**

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Some authors ascribe osteogenic potentialities to the periosteum and feel that it is important for normal nutrition of bone and for repair of injuries to the cortex. Others have observed no nutritional disturbance or decrease in bone regeneration in the absence of periosteum or after experimental fractures, partial resections and drill holes. There is also no uniformity among observations made