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Non-Effect of Cortisone on Growing Bones of Mice, Guinea Pigs and Rabbits. (19195)

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When cortisone acetate is administered to growing rats, a zone of increased density appears at the ends of the long bones and at the costochondral junctions(1). Such a metaphyseal area of increased density is composed of spicules of calcified cartilagenous matrix encased in bone. The pathogenesis of this change has been interpreted to be due to a decrease in normal osteolytic sequences(1). It seemed appropriate, therefore, to examine the skeletal tissues of several other species to which cortisone acetate* had been administered in order to determine whether changes similar to those encountered in the rat might be observed.

Experimental Mice. Weanling and full grown mice were given cortisone acetate in daily doses ranging from 10 to 75 mg per kilo. Animals were sacrificed from the 3rd up to the 23rd day. X-rays were taken of the upper ends of the tibiae; sections of these bones were studied microscopically. Aside from a retardation of growth in the young animals receiving 50 and 75 mg cortisone per kilo per day no changes were found in the metaphyses.

Guinea pigs. Guinea pigs weighing 180 to 200 g at the beginning of the experiment were given 5, 12.5, 25 and 50 mg cortisone acetate per kilo per day; animals were sacrificed at intervals from the 12th to the 37th day of treatment. X-rays and microscopic sections of the ribs and upper ends of the tibiae showed no changes save a retardation of growth in the animals receiving 50 mg cortisone per day.

Rabbits. Young rabbits, weighing 800 to 1000 g were given 5, 10, 25, 40, and 80 mg cortisone acetate per kilo per day and were examined at intervals after the 12th to the 37th day of such treatment. X-rays and sections of the ribs showed no changes save retardation in growth in the animals receiving 80 mg cortisone per day.

Discussion. Changes which may be produced in the rat's skeleton when appropriate doses of cortisone acetate (40-50 mg per kilo per day) are administered have been interpreted as being due to a failure of normal resorptive processes(1). In this they resemble bony alterations which may be encountered in the same species as a result of the influence of large amounts of estrogen. Under such circumstances normal osteolytic sequences appear to be inhibited(2,3). Since, in contrast to the rat, the effects of estrogen on the skeletal tissues of the mouse are so different and so striking, *i.e.* a tremendous stimulation of endosteal activity(4), a study of this species was approached with great interest. The results of cortisone administration, however,

* The cortisone acetate (Cortone) was kindly supplied by Merck and Co., Rahway, N. J.

were entirely negative. Any specific response of the guinea pig or rabbit to cortisone was also lacking. The effect of cortisone on the rat would, therefore, appear to be unique among the species so far studied. In this respect, it should be recalled that, aside from its action on the mouse which was referred to above, estrogen appears to have no specific effects on all other mammalian species which have been studied so far save the rat(3).

Summary. Varying amounts of cortisone acetate were administered to growing mice, guinea pigs, and rabbits. This hormone in the doses used appears not to have an effect such as has been observed in the rat on the skeletal tissues of these species. Since large amounts led to a retardation in growth, it would seem unlikely that the mouse, guinea pig, or rabbit is less sensitive to the hormone.

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An Improved Recording Rotameter. (19196)

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In many physiological studies it is desirable to obtain continuous measurement and registration of the mean rate of blood flow through a particular blood vessel. An optically recording rotameter which was designed for this purpose(1,2) operated on an electromagnetic principle, and changes in blood flow through the rotameter were detected and translated into proportionate deflections of a light beam reflected from a galvanometer mirror. The use of an electronic circuit involving an oscillator, amplifier, and rectifier made the apparatus relatively difficult to construct and maintain without some degree of technical knowledge. For this reason an attempt was made to simplify and improve the flow metering device without sacrificing sensitivity or accuracy. The construction and performance of the redesigned instrument is reported here.

In Fig. 1 is shown, in sectional view, the metering and detecting portions of the rotameter proper. Construction details are given in the legend. The metering chamber illustrated is designed to cover a flow range of 0-400 cc/min. Other metering chambers which are interchangeably attachable to the detecting portion have been constructed for individual ranges having top flows of 100, 200, 800, 1600, and 3000 cc/min.

The electrical circuit diagrammed in Fig. 2 was constructed from standard parts and assembled in a small control box measuring 3 x 4 x 5 inches.

The entire apparatus is shown in Fig. 3. By viewing the 0-25 microammeter (100 arbitrary scale divisions) the changes in flow through the rotameter could be noted visually. A simple optically recording galvanometer was constructed as follows. The jewel bearings of a 0-200 microammeter were removed, the coil suspended by two nylon filaments and a 3 mm x 3 mm mirror cemented to the counterbalance end of the pointer arm. A rectangular opening was cut in the meter case opposite the mirror and a glass window sealed in place with wax. To provide a stable support, pointed legs were attached to the case through the three mounting holes. A variety of commercially available mirror galvanometers may also be used for recording on sensitized paper or film. The maximum output is approximately 25 μA and 0.1 volt. With supplementary DC amplification, satisfactory records have been made with instruments employing a hot stylus or a pen writer.

Calibrations of the instrument remain con-