was taken as a measure of the degree to which sub-maxillary tissue is able to concentrate iodine.

The results are given in Table 1.

These results show that there is a sexual difference in the capacity to concentrate iodine by the submaxillary gland of mice.

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Uptake of Magnesium-28 by the Skeleton of a Sheep

In order to find the cause of hypomagnesaemia in adult ruminants, it is necessary to have a better understanding of the mechanism controlling magnesium-levels in blood and particularly the relationship between bone and blood magnesium. Bone from cows suffering from hypomagnesaemia showed no depletion of magnesium¹, and this has led to the theory that the lability of bone magnesium is much reduced in adult animals². There are no figures in the literature, however, for either the amount or the rate of mobilization of skeletal magnesium in adult ruminants, but such data can be obtained from work on the uptake of radioactive magnesium by bone. Because of the short half-life of magnesium-28, only that part of the bone magnesium which is rapidly exchanged with the magnesium of plasma and other body fluids can be measured.

After six days on a constant diet of grass nuts containing 1.2 gm. of magnesium, a five-year-old Greyface wether, weighing about 65 kgm., was given 40–60 μ c. carrier-free magnesium-28 as the chloride into the jugular vein. 10 hr. later, immediately after sampling the blood, the sheep was killed by exsanguination under nembutal anaesthesia, and duplicate samples of bone, free so far as possible from blood and bone marrow, were taken from various parts of the skeleton and their radioactivity determined the same day in a well-type scintillation counter.

The values obtained for the calcium-magnesium ratio and specific activity of the samples of selected bones are given in Table 1. The specific activities are expressed both as the percentage of dose $\times 10^2$ per mgm. of total magnesium and as the percentage of the specific activity of the plasma, the latter being a measure of the proportion of bone magnesium which has exchanged with the magnesium of body fluids during the 10-hr. period.

A marked variation in specific activity from bone to bone was observed and was greater in regions of rapid bone metabolism than in compact bone. Thus

Table 1. RATIO OF CALCIUM TO MAGNESIUM IN THE SELECTED BONES AND THEIR UPTAKE OF MAGNESIUM-28 AT 10 HR. AFTER INTRAVENOUS ADMINISTRATION

Bone	Calcium/magnesium	Specific activity (percentage of dose) ($\times 10^2$ per mgm. magnesium)	Specific activity (as percentages of specific activity of plasma)
Femur shaft	57	0.048	0.86
Femur epiphysis	52	0.130	2.3
Rib shaft	56	0.079	1.4
Rib sternal end	46	0.129	2.3
Lumbar vertebra	46	0.099	1.7

the sternal end of the rib and the epiphysis of the femur showed the greatest exchange and the femur shaft the lowest.

The over-all percentage of bone magnesium in equilibrium with the magnesium in the body fluids was low; the values for the samples of individual bones ranged from 0.86 to 2.3 per cent. The limiting factor may be the exchange-rate itself or the amount of bone magnesium which is available for exchange. It is interesting to note that the variation in specific activity of individual bones was in the same order as the degree of magnesium depletion in the corresponding bones from magnesium-depleted calves³.

There are no analytical figures in the literature for the magnesium content of the skeleton of either adult cattle or sheep. Estimates can be made from the calcium content of the skeleton of dairy cows⁴ and sheep, and the calcium-magnesium ratio in bone. The calculated values for cows range from 90 to 160 gm. depending on the size of the animal, and for sheep from 8 to 10 gm.; the figures for sheep are based on only three analyses. If the reserves of bone magnesium are assumed to be the same as the percentage of bone magnesium which has later reached equilibrium with the magnesium of body fluids, namely, 2 per cent, the skeleton of dairy cows contains 1.8–3 gm. of magnesium which can be released to satisfy physiological needs, that is, enough for 3–5 gallons of milk. In the case of sheep, the reserves (160–200 mgm.) are equivalent to the endogenous faecal loss for 1 day⁵. The lactating animal may be more efficient in mobilizing bone magnesium than the non-lactating animal, since the resorption of bone mineral to provide the calcium necessary for lactation will also release magnesium⁶. This effect, however, will be small because of the wide ratio of calcium to magnesium in bone and the fact that the release of calcium from bone is small, for example, less than 20 gm. a day for dairy cows⁶.

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