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The influence of sunlight on the mineral nutrition of swine.

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In a previous publication¹ the writers have reported a study of a condition of stiffness in swine, in which inadequate mineral nutrition was found to be a cause of the trouble. In this study the experimental animals had been so housed that they were never exposed to direct sunlight. The present paper describes a repetition of a portion of the previous experiment to study how the results might be modified were the pigs exposed to sunlight.

The ration used consisted of 200 lbs. yellow corn meal, 100 lbs. wheat middlings, and 75 lbs. oil meal—a ration very low in calcium.

In the spring of 1924, 4 pure bred Duroc pigs were placed on this ration in a pen on the north side of the colony house as in previous studies. A second group of 4 was placed on the same ration in a pen on the south side of the house opening on a cement run-way outside, 7 x 12 ft., thus giving the pigs access to direct sunlight. The experimental animals were so selected and distributed between the two pens that the comparative chemical and pathological studies could be made upon litter mates. Over an experimental period of four months, all of the pigs in the no-sunlight group developed the characteristic stiffness, while none of the pigs in the other group showed any signs of the trouble.

At the end of the four-months period the pigs were killed for routine pathological examination of the bones. On chemical analysis the femurs of the sunlight group were found markedly higher in ash content than those of their litter mates fed the same ration without sunlight.

The comparison between the sunlight and no-sunlight groups was repeated the following winter. Again, all of the pigs in the no-sunlight group became stiff, and one pig in the sunlight group became slightly stiff also. For three out of four of the pairs of litter mates compared, the ash content of the femurs of the pigs

¹ Cornell Agr. Expt. Sta. Memoir 86, 1925.

exposed to sunlight was higher than was the case with the other group, by approximately the same amount as in the previous trial. For the other pair of litter mates no difference was noted.

The results of the two trials are in general agreement in indicating that sunlight increased the assimilation of calcium in the calcium-deficient ration and prevented the development of the stiffness over the four-months experimental period.

On gross examination, the femurs of the pigs in the no-sunlight group in both trials showed lesions similar to those previously reported by the writers.¹ The cortical bone was soft and porous. The marrow in the shaft was reddened throughout or near the epiphyseal cartilage. The latter was thickened and very irregular. There were hemorrhages under the articular cartilage of the head of the femur. In one pig there was a subperiosteal hemorrhagic zone over the entire extent of the cortical bone, apparently containing spongy, osseous or osteoid tissue. The bone of the femurs of the sunlight group was much denser and was more completely calcified. There were only scattered reddened areas in the marrow of the shaft. The epiphyseal cartilage was irregular but less so than for the no-sunlight group. Thus the results of the pathological examination of the femurs were in agreement with the chemical analyses in showing that the sunlight has a marked influence on bone development.

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A method for the quantitative study of intestinal absorption.

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In previous methods for the study of absorption, isolated intestinal loops of dogs, cats and rabbits were used, and generally one of two principles was followed: Either an acute experiment was made, which involved narcosis of the animal and a laparotomy; or a Vella fistula was established in a preceding operation. One disadvantage of these methods is that experiments made on