plete operation of thyro-parathyroidectomy performed on them and no noticeable symptoms have followed.

In the sheep therefore it would appear that both the thyroid and parathyroid glands are much more important organs in the young than in the adult animal, and consequently that they become functionally less active as age advances.

In relation to the influence of the parathyroids on calcium metabolism it is interesting to note that the two young lambs which showed acute parathyroid tetany were fed almost entirely on milk, rich in calcium salts, while the three which had the external parathyroids removed when they were about fourteen months old, and the other two parathyroidectomized adults, lived on a purely herbivorous diet in which potassium salts predominate. It may be, however, that in the young animal, where bone is being rapidly formed, the ratio between the demand for calcium and the supply is even greater than in the adult, although in the latter a far smaller quantity is being ingested.

In the case of the adult sheep the results of thyro-parathyroidectomy are in agreement with those of MacCallum[1] who from a similar operation found that "Practically no effect whatever was produced in these five sheep, although in at least three of them ample time elapsed for the development of symptoms." The other two died early of pneumonia, due probably to the administration of ether.

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Peculiarity in the mode of entrance of the optic nerve into the eyeball in some rodents.

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In the majority of animals the optic nerve enters the eyeball as a round compact bundle of nerve fibers and the optic disc is circular in outline or nearly so. While removing the eyes from the woodchuck and prairie dog for histological material, I observed that here there was an exception to the general rule in that the

[1] MacCallum, *Johns Hopkins Hosp. Bull.*, 1907, xviii, p. 335.

optic nerve became transformed into a band flattened antero-posteriorly before it entered the eyeball, and that the disc was linear instead of circular in outline. In these animals the disc consists of a long slender band, bending slightly dorsally in the center and gently widening at the ends. The absence of rods and cones along this band indicates that it is a true blind spot. As far as the investigation has been carried on, this form of optic disc was found to reach its greatest development in the prairie dog and has only been observed in members of the family Sciuridæ. Further investigation is necessary to show whether this peculiarity is limited to species of this family.

Johnson[1] has pointed out the presence of an elongated disc in the squirrel and marmot, but he makes no statement regarding the mode of entrance of the optic nerve into the bulbus oculi. As stated above, the optic nerve spreads out in an antero-posterior direction shortly after it enters the orbit and penetrates the coats of the eye in the region marked by the optic disc. In the woodchuck and prairie dog the flattened portion of the optic nerve is slightly concave on both the dorsal and ventral sides, and the latter is marked by a slight groove extending along the long axis of the nerve midway between the ends of the disc. The optic nerve from a short distance within the orbit to the chiasma has the usual cylindrical outline. This tendency of the nerve to bifurcate is also seen in the squirrel and chipmunk but it has not developed to the same extent as in the animals above mentioned.

In the rabbit's eye the optic nerve enters the eyeball as a cylindrical bundle of nerve fibers, from which one might expect the optic disc to be circular in outline, but this is not the case as has been observed by Johnson and figured by Haab.[2] The optic papilla is nearly circular but instead of the fibers radiating from it to the different parts of the retina they divide into two nearly equal portions which run in opposite directions toward the equator of the eyeball. From these two bands the fibers spread out to the different parts of the retina. The expansion of the optic nerve on the inside of the bulbus oculi of the rabbit, in contrast to its spreading out on the outside of the bulbus in some forms of the

[1] Johnson, *Phil. Trans. Roy. Soc.*, 1901, 194 B, p. 30.

[2] Haab, cited by Fuchs, " Physiologisches Praktikum für Mediziner," p. 227.

family Sciuridæ may suggest an intermediate stage in the process of evolution between the latter group and those higher mammals in which the fibers radiate to all parts of the retina from a circular optic disc. However, an extended investigation is necessary before any conclusion can be arrived at with regard to the possible taxonomic value of this character.

Experiments to trace the fibers of the optic tract are now in progress. As the optic nerve is spread out near the eyeball, it is a simple operation to cut either the inner or outer half for a study of the degeneration of its fibers.

So far I am not in a position to offer any opinion regarding the physiological significance of this peculiarity.

Note.—In the case of the squirrel and European marmot this peculiarity in the optic nerve is mentioned in Cuvier's "Leçons d'Anatomie Comparée," Tome 3B, p. 430.

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Biological and toxicological studies upon *Penicillium puberulum* Bainier.

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This species when grown upon Raulin's solution, in pure culture, produces a new organic acid which has been termed penicillic acid. This acid gives a brownish-red solution when treated with a dilute solution of ferric-chloride. With ammonia it gives a deep red color. From the analyses, molecular weight determinations and other data, it seems probable that this acid belongs to the same general class of compounds as are found in lichens, and termed lichen acids. Like them, it is slightly bitter and irritating. Pharmacologically, it is moderately toxic, having an antiseptic action and being a protoplasmic poison. It is not astonishing to find substances of this class in fungi, since lichens are symbiotic forms, composed of fungi and algæ. The finding of this type of substances in the pure culture of a fungus makes it probable that in lichens, lichen acids are the product of the fungus metabolism, and not of that of the algæ.