exophthalmos following the injection of androgens. We have no explanation as to why some rabbits failed to develop exophthalmos. Similar failures, however, occur in guinea pigs with pituitary extracts, as well as in rabbits following partial thyroidectomy. These failures indicate that other unknown factors must be favorable in order to obtain exophthalmos. There is some evidence that one of these factors is a disturbance of mineral metabolism, especially the Ca-P ratio. Four female rabbits received testosterone propionate. In only one—an ovariectomized rabbit with latent exophthalmos—did exophthalmos develop. The two with intact ovaries developed intense oestrus as determined by vaginal and vulval reactions and sexual receptivity.

Summary. The data here reported indicate that thyroid insufficiency associated with increased pituitary and androgenic activity (active or passive) are important factors favoring the development of exophthalmos in rabbits. The androgenic factor is believed to play a rôle in the percentile increase in the incidence of post-thyroidectomy exophthalmos in Graves' disease in males.

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Sugar Alcohols XIII. Primulatol and Glycogen Storage in the Rat.

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Roe and Hudson[1] demonstrated that β d-mannoheptulose is physiologically available to the rabbit which has a high tolerance for this heptose. In the studies of the fate of the sugar alcohols and their anhydrides in the animal body in which mannitol[2] was shown to be a precursor of glycogen the possible utilization of the corresponding sugar alcohol, β d-mannoheptitol became of interest. The β d-mannoheptitol was extracted from *Primula officinalis* by the method of Bougoult and Allard.[3] The compound melted uncorrected at 153°.

Rats were fasted for 51 hours. After this period the control

1 Roe and Hudson, *J. Biol. Chem.*, 1936, **112**, 443.

2 Carr, Musser, Schmidt, and Krantz, *J. Biol. Chem.*, 1933, **102**, 721.

3 Bougoult and Allard, *Compt. rend.*, 1902, **135**, 796.

animals were fed a diet of cacao butter and the experimental animals a mixture of 1 part primulatol and 2 parts cacao butter. After 72 hours all the animals were killed under amytal anesthesia and their livers were immediately extirpated. The glycogen was determined by Good's[4] modification of Pflüger's[5] method and the glucose determined by the Shaffer-Hartmann[6] method. β d-Mannoheptitol was recovered from the rats' urine and identified by its melting point. The results are set forth in Table I.

TABLE I.
Effect of Primulatol on the Glycogen Storage in the Livers of Rats.

Rat No.	Wt. before experiment gm.	Primulatol consumed gm.	Liver Glycogen %
Experimental			
2	113	2.8	.26
3	129	2.3	.11
4	122	2.0	.17
5	152	2.4	.07
6	149	2.5	.17
7	152	2.5	.10
8	134	2.5	.24
10	112	1.7	.10
			Aver. .15
Controls			
11	122		.08
12	133		.21
13	126		.13
14	117		.16
15	128		.09
			Aver. .13

Conclusion. β d-mannoheptitol unlike the hexahydric alcohol, mannitol, and the heptose, β d-mannoheptulose, is not capable of serving as a precursor of glycogen in the liver of the rat.

[4] Good, Kramer, and Somogyi, *J. Biol. Chem.*, 1933, **100**, 485.

[5] Pfluger, *Pfluger's Arch.*, 1906, **114**, 242.

[6] Shaffer and Hartmann, *J. Biol. Chem.*, 1920-21, **49**, 349.