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Production of Goiter and Exophthalmos in Rabbits by Administration of Cyanide.

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We have shown that several of the organic cyanides¹ when injected subcutaneously into rabbits daily for 3 or more weeks produce thyroid hyperplasia. Methyl cyanide produces the greatest thyroid reactions, and young rabbits (3 to 4 months) are more reactive than adults to the same doses per kg.

Chronic bilateral exophthalmos has occurred in a significant number of prepubertal rabbits after methyl cyanide has been given for varying lengths of time. Exophthalmos has developed as early as the 20th day after beginning daily injections of 0.1 cc. of methyl cyanide in 3 months old rabbits. Of the 2 breeds used (Dutch and Belgian) we have observed it most frequently in young Dutch rabbits. It has not been detected in adults (6 months and over) in either strain. Representative instances are given in Table I.

So far we have observed only moderate degrees of exophthalmos. It occurs earliest in those rabbits which develop thyroid hyperplasia the quickest and appears to be proportional to the degree of thyroid hyperplasia. Rabbits that have failed to develop thyroid hyperplasia, or rabbits in which the hyperplasia has been slight have not developed exophthalmos. When exophthalmos is develop-

TABLE I.

No. Exp.	Sex	Age	Breed	Weight	Daily No. days Condi- Dosage Before tion of			Remarks
					CH ₃ CN	Exoph.	Thyroid Detected	
		(mo.)		(gm.)	(cc.)			
175	M	4	Dutch	1184	0.1	39	+++	
"	M	4	"	1341	"	60	+++	
"	F	4	"	1410	"	—	—	No exoph. 63rd day
187	M	3	Belgian	1795	"	—	+±	No exoph. 29th day
"	M	3	Dutch	1491	"	20	++	
"	M	3	"	1564	"	28	+±	
"	F	3	Belgian	1862	"	—	+	No exoph. 29th day
"	M	3	Dutch	1410	"	22	++	
"	M	3	"	1767	"	—	+	No exoph. 29th day
160	M	5	Belgian	1911	0.15	—	—+	No exoph. 25th day
"	M	5	"	1908	"	—	+±	No exoph. 25th day

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¹ Marine, D., Baumann, E. J., Spence, A. W., and Cipra, Anna, *Proc. Soc. Exp. Biol. and Med.*, 1932, **29**, in press.

ing the rabbits become nervous and fidgety. This is frequently associated with soft feces and an increase in the volume of urine.

No attempt has been made to determine what rôle the hormones of the posterior pituitary and chromaffin tissue may play in the production and maintenance of the exophthalmos. There is, however, some hypertrophy and great hyperemia of the medulla of the suprarenals in these animals.

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Survival Period of Bilaterally Adrenalectomized Rats.

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Wide discrepancies exist in the literature as to the life-span of adrenalectomized rats. Most of the work between 1900 and 1930 indicated that approximately 50% of these mammals survived adrenalectomy for a month or indefinitely. This survival was attributed to the presence of accessory cortical tissue. Recently, however, Pencharz, Olmsted and Giragossintz^{1, 2} reported that the rat is no exception to the rule that adrenalectomy is fatal in mammals. Freed, Brownfield and Evans³ stated definitely that adrenalectomy was uniformly fatal in rats if one-quarter inch of the pedicle was removed with the gland. Kutz⁴ stated that out of 57 animals of his strain operated at 4 weeks age, 56 were dead by the tenth day. While these results were being reported other workers have been reporting a high percentage survival. The present study was undertaken in an attempt to give some explanation to this chaos of evidence.

A series of 156 adrenalectomies were done to investigate the effects of different types of operation in animals of different ages and different strains. Rats from 35 days to 10 months age were used from 5 different colonies. To demonstrate that the animals

* This study was suggested by Professor W. W. Swingle and his advice and assistance have been generously given.

¹ Pencharz, R. I., Olmsted, J. M. D., and Giragossintz, G., *Science*, 1930, **73**, 175.

² Pencharz, R. I., Olmsted, J. M. D., and Giragossintz, G., *Phys. Zool.*, 1931, **4**, 501.

³ Freed, S. C., Brownfield, B., and Evans, H. M., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **29**, 1.

⁴ Kutz, R. L., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **29**, 91.