daily intake of approximately 120 mg and equal to at least 500 mg per kilo of body weight.

The sulfanilamide had no apparent effect on the *Bartonella muris*. All 15 of the treated rats gave positive blood smears, taken on the third to fifth day after being infected, and 10 died within 12 days. These were practically the same results as obtained in 15 untreated controls where 14 gave positive blood smears and 8 died. The effectiveness of sulfanilamide was further tested by adding 1% to the solution of physiological saline and sodium citrate just described for Group A. The donor blood was added to this 1% mixture and allowed to stand 10 minutes, then injected intraäbdominally into the splenectomized recipient rats. The results again failed to show any beneficial effect from sulfanilamide; 13 of the 15 rats in this group showed positive blood smears and all were dead within 12 days. The toxicity of the sulfanilamide may have contributed to the high mortality in this group as compared to the controls. In all groups the *Bartonella muris* bodies disappeared rapidly from the blood and were usually not found after the fifth day, even though the symptoms were so severe that the rats continued in an emaciated condition for several more days. After the twelfth day, few died.[2, 3]

Summary. Splenectomized rats infected with *Bartonella muris* were treated with sulfanilamide in doses of 500 mg per kilo of body weight. A study of 30 rats thus treated showed that the treatment had no detectable effect on *Bartonella muris*. The toxicity of the sulfanilamide seemed to be a factor contributing to the mortality.

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Effect of Thymectomy at Birth on Spermatogenesis in the Albino Rat.*

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Shay, *et al.*,[1] reported severe retardation of spermatogenesis following roentgen destruction of the thymus during the first few days of the rat's life. It would appear that if X-ray treatment of the

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1 Shay, Harry, Gershon-Cohen, Jacob, Fels, Samuel S., Meranze, David R., and Meranze, Theodore, *J. Am. Med. Assn.*, 1939, **112**, 290.

thymus of newborn rats exerts such an influence on the testes, then complete surgical removal of the thymus at the same age would achieve similar results. This paper reports results of thymectomy in newborn albino rats with special reference to the progress of spermatogenesis.

Methods and Materials. The histological criterion for spermatogenesis used was that reported by Moore[2] in which the "sperm-head stage" appears between 33 to 35 days of age.

Forty-six male albino rats, representing 11 litters, were used. In all cases the litter was employed as the unit. The testes of thymectomized rats were compared with those of unoperated or sham-operated littermate controls. The thymus was removed before the animal was 24 hours old. Operations were performed under ether anesthesia or after chilling the animal. A mid-ventral section of the anterior end of the sternum was made back to the 4th intercostal space. Only those cases have been considered in which the thymus was removed *in toto* without surgical complications; in which no accessory cervical thymic tissue was seen at the time of the operation; and in which histological examination of suspected thymus rests, recovered at autopsy and sectioned serially, proved not to be thymus tissue. Both thymectomized animals and their littermate controls were weighed at 5-day intervals and were sacrificed at 33, 37, and 38 days.

Testes and seminal vesicles were weighed fresh and fixed in Bouin's solution. Complete cross sections of testes were cut at 7 micra and stained with Ehrlich's hematoxylin. Fifty seminiferous tubules were inspected in each of 5 different sections. The percentage of tubules containing sperm heads in the 250 tubules thus examined per animal was recorded as an index of the amount of spermatogenesis that had taken place.

Effect on testis. Table I presents data recorded for 46 rats, 25 of which were completely thymectomized at birth. The results of sperm head counts in exactly 250 seminiferous tubules per animal are expressed in percentage. It will be seen that all 9 thymectomized rats from 4 litters sacrificed at 33 days of age failed to show any sperm heads in the testes. In 5 of the 7 littermate controls, autopsied at the same time, sperm heads were completely missing. In 2 of the controls, 0.8% of the tubules contained sperm heads.

Out of 14 thymectomized rats sacrificed at 37 days of age, 12 showed sperm heads in 10% to 42% of the tubules examined, and 2 (Nos. 118 and 119) failed to exhibit sperm heads. Two unop-

[2] Moore, Carl, R., *Am. J. Anat.*, 1936, **59**, 63.

TABLE I.
Spermatogenesis in Rats Thymectomized at Birth.

Litter No.	Rat No.	Age in days	% of seminiferous tubules with sperm heads*		
				Controls	
			Thymectomized	Not operated	Operated
52	85	33	0		
	86	33	0		
	87	33		0	
	88	33		0	
53	89	33	0		
	90	33	0		
	91	33	0		
	92	33			0
	93	33		0.8	
59	108	33	0		
	109	33	0		
	110	33			0
	111	33			0.8
58	101	33	0		
	103	33	0		
	106	33		0	
	102	37	10		
	104	37	23		
	105	37	22		
	107	37		20	
49	78	37	23		
	79	37		37	
	80	37		31	
50	81	37	42		
	82	37	18		
	83	37		31	
	84	37		24	
54	94	37	21		
	95	37	25		
	96	37			26
57	97	37	30		
	98	37		0	
	99	37		5	
60	113	37	30		
	114	37	30		
	115	37		31	
	116	37		34	
61	117	37	11		
	118	37	0		
	119	37	0		
	120	37		0	
	121	37		0	
48	74	38	33		
	75	38	24		
	76	38		29	
	77	38		31	

*250 seminiferous tubules examined in each animal.

erated littermate controls of the latter (Nos. 120 and 121) also revealed no sperm heads. One other control (No. 98) failed to show sperm heads on this day, whereas 9 had sperm heads in from 5% to 37% of the tubules observed.

In one litter of 4 males sacrificed at 38 days of age, both the 2 operated and the 2 control animals showed sperm heads in 24% to 33% of the tubules.

Neither absolute nor relative fresh testicular weights were influenced by thymectomy. This is an interesting point in view of the fact that gonadectomy of newborn male or female rats causes a definite hypertrophy of the thymus.[3]

These results indicate that thymectomy of the newborn male rat neither accelerates nor retards the process of spermatogenesis as judged by the first appearance of sperm heads in the testis.

Effect on seminal vesicle. Gross and histological examinations were made of the seminal vesicles of thymectomized rats and their respective littermate controls. The histology of the seminal vesicle has been described as a reliable indicator of male hormone secretion.[4] At 33 days of age both thymectomized and control rats showed granular cytoplasm in the epithelium of the seminal vesicle. At 37 and 38 days distinct secretion granules were found in the vesicles of operated and control animals. Furthermore, the absolute and relative fresh weights of the seminal vesicles were practically the same for both groups.

Individual body weights, recorded at 5-day intervals, gave no indication that thymectomy in rats at birth, if unaccompanied by surgical complications, has any influence upon general body growth up to 37 days of age.

Summary. Twenty-five male albino rats from 11 litters were thymectomized at birth. These were sacrificed at the ages of 33, 37, or 38 days. Testes and seminal vesicles were compared with 21 unoperated or sham-operated littermate controls. The results indicate that complete thymectomy of newborn rats neither hastens nor retards spermatogenesis, hormone output or growth of the testis.

[3] Plagge, James C., unpublished.

[4] Moore, Carl R., Hughes, Winifred, and Gallagher, T. F., *Am. J. Anat.*, 1930, **45**, 109.