TABLE I.
Elevation in Metabolic Rate in English Sparrows Receiving Continuous Injections of Thyrotropin.

	Date	Injection period, wks	% elev. in MR
1st Group	3-3-37	7½	+20.30
(begun 1-10-37)	3-15-37	9	+17.09
2nd Group	11-2-37	2	+16.14
(begun 10-18-37)	11-23-37	5	+15.75
	3-10-38	20½	+12.86

These results indicate that the sparrow thyroid does not become refractory to continued pituitary administration. Greep, using the same thyrotropic preparation, reported that during continuous injections, the guinea pig thyroid returns to normal within 4 weeks. Evidently the bird is peculiar in failing to show this type of immunity reaction.

Summary. In the English sparrow, prolonged injection of sheep thyrotropic hormone does not lead to the development of refractoriness. The thyroids remain enlarged and hyperplastic, and the elevation in metabolic rate is maintained over periods up to 5 months.

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Testes and Hypophyses in Gassed Male Rats.

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A degree of chronic carbon monoxide asphyxia in man is frequent since daily inhalation of small amounts of illuminating gas is common experience. Williams and Smith[1] have shown typical asphyxial blood changes, decrease in body weight, and sterility to occur in male rats treated daily with illuminating gas. The present study concerns testicular and hypophyseal changes.

Eighty-eight male albino rats, Ames-Wistar strain, were arranged in 2 groups of 44 each, litter mates being equally distributed. A closed circuit respiratory apparatus into which illuminating gas could be measured directly from the city main was used; one group

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1 Williams, I. R., and Smith, Erma, *Am. J. Physiol.*, 1935, **110**, 611.

was exposed daily for an hour to 1.43% gas-air mixture. The mixture contained 0.34% CO.† Immediately after the hour of exposure the mean COHb was 50% and the blood sugar 132.0±1.6 mg %; 24 hours after exposure the mean COHb was 5% and the blood sugar 100.1±.05 mg %.

After periods of treatment, ranging from a minimum of 50 to a maximum of 131 days, and 24 hr after the last gassing interval the rats were killed by decapitation. Eight hypophyses were prepared for cytologic study by the method of Severinghaus.[2] The testes were removed and weighed. Hanging drop preparations from the epididymides were examined for motility and number of spermatozoa.

TABLE I.
Testes.

No. of rats	Mean wt, g, right and left testes and epididymides	% of body wt	% decrease	Spermatozoa, motility and no.	Mating history
Control 44	4.28 ± .05	1.55		Myriads, actively motile	+
Gassed 44	2.01 ± .04	0.8	46	None or a very few sluggishly motile, or non-motile	—

FIG. 1.
Photomicrograph of section of hypophysis from normal ♂ rat × 1180. b = basophile; c = chromophobe; e = eosinophile.

† For other constituents of the gas see [1].

[2] Severinghaus, Anna E., *Anat. Rec.*, 1932, **53**, 1.

The mating history was negative in rats exposed to gas for 50 or more hours. Frequently no sperm could be seen in the hanging drop preparations from gassed rats, but prepared slides consistently gave evidence of spermatogenesis. If sperm were present usually they were nonmotile. The testicular size decrease is shown in Fig. 3.

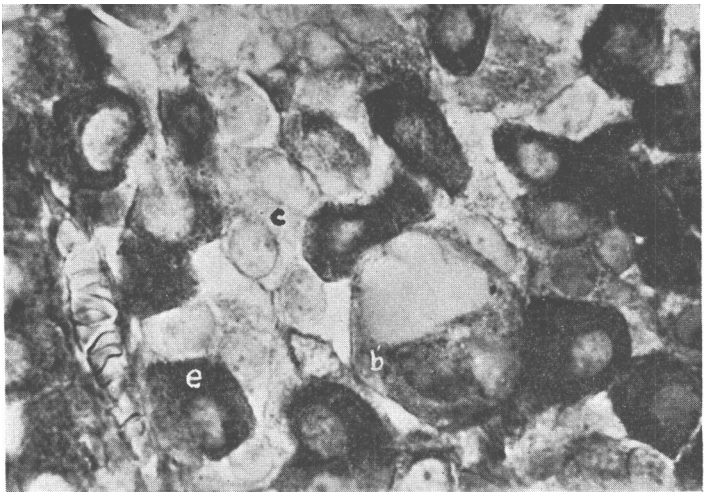

FIG. 2.
Photomicrograph of section of hypophysis from gassed ♂ rat × 1180. b′ = vacuolated basophile; c = chromophobe; e = eosinophile.

Hypophyses. Figs. 1 and 2. Vacuolated and enlarged basophiles characterize the microscopic structure of the hypophyses in gassed rats. The mean diameters of 20 vacuolated basophiles were 23.83 μ by 15.35 μ; vacuole diameters 13.89 μ by 8.89 μ; nonvacuolated basophile diameters 20.9 μ by 10.9 μ. The mean diameters of nonvacuolated basophiles of the controls were 16.6 μ by 10.9 μ. Acidophile diameters did not differ in control and gassed animals.

The above closely resembles the hypophyseal changes described by Addison[3] as induced by castration. Since the basophiles are considered to be the cells which produce gonadotropic hormones, biologic assay of the hypophyseal hormones in the sterile gassed rats was the next procedure. The response of immature female rat ovaries and uteri was used to measure the gonadotropic potency.

Hypophyseal Hormone. Fig. 3 and Table II. When 36 of the male rats above described were decapitated, the entire hypophyses were removed aseptically, weighed in sterile containers, macerated by means of glass rods, and injected subcutaneously into immature

[3] Addison, W. H. F., *J. Comp. Neurol.*, 1917, **28**, 441.

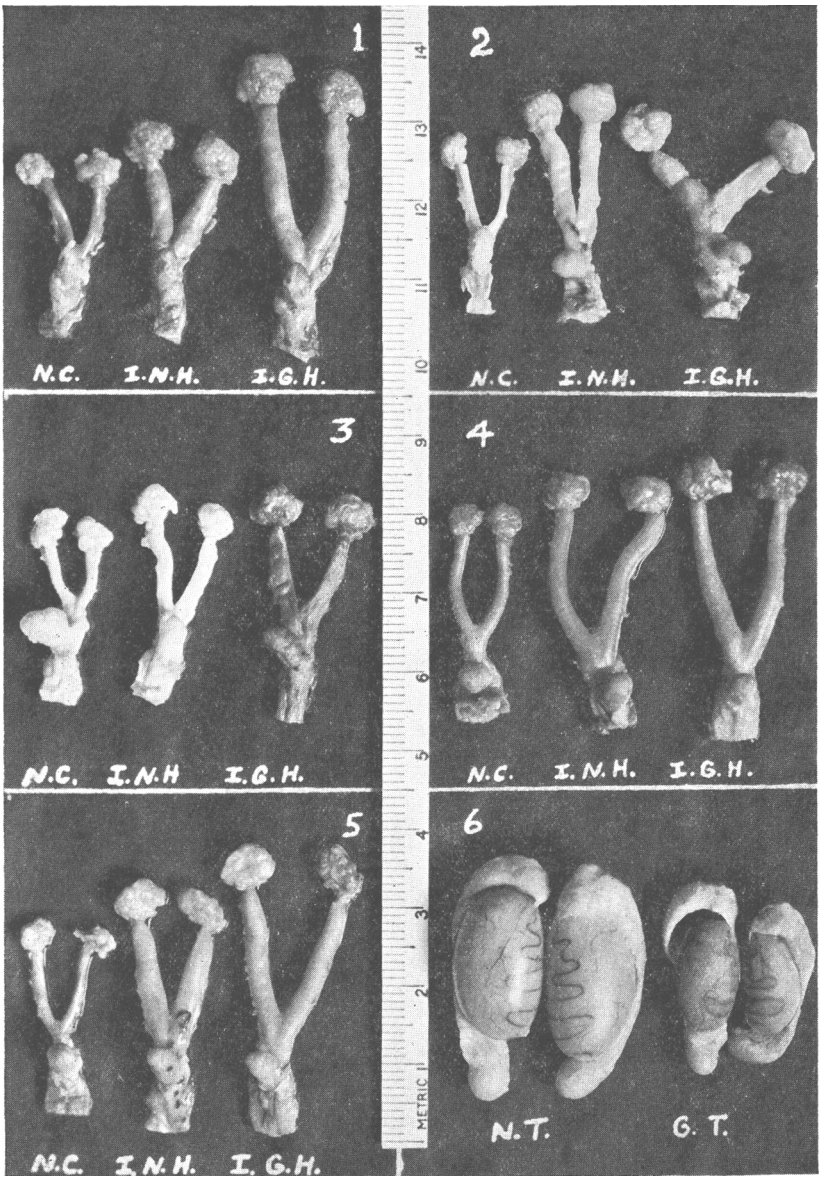

FIG. 3.

1, 2, 3, 4, 5, Ovaries and uteri of ♀ test rats. N.C., noninjected control; I.N.H., control injected with six hypophyses from normal ♂ rats. I.G.H., test ♀'s injected with six hypophyses from gassed ♂ rats. 6, Testes. N.T., normal rat; G.T., gassed litter mate. (Actual size.)

TABLE II.
Hypophyseal Hormone.*

	Series	Hypophyses total wt in mg 6 ♂'s†	♀ rats age, days	♀ rats wt, g	Ovaries wt, g‡	Uteri wt, g‡
Control ♀'s	1		26	65	19.2	36.1
Non-injected	2		23	38	14.7	23.7
N.C.	3		23	39	16.4	30.0
	4		25	72	31.1	57.3
	5		26	42	16.1	29.6
	Total		123	256	97.5	176.7
	Mean		24.6	51	19.5	35.3
Control ♀'s	1	45.4	26	66	68.1	101.0
Injected with	2	45.7	23	41	47.9	76.2
6 hypophyses of	3	38.9	23	41	34.0	64.1
ungassed ♂ rats	4	41.7	25	57	60.4	104.3
I.N.H.	5	41.9	26	43.5	64.3	127.0
	Total	213.6	123	248.5	274.7	472.6
	Mean	42.7	24.6	49.7	54.9	94.5
Test ♀'s	1	48.1	26	65	79.7	146.0
Injected with	2	46.9	23	45	95.0	130.5
6 hypophyses of	3	46.9	23	41	77.5	87.2
gassed ♂ rats	4	40.9	25	59	110.8	129.5
I.G.H.	5	38.2	26	44	80.3	129.2
	Total	221.0	123	254	443.3	622.4
	Mean	44.2	24.6	50.8	88.6	124.5

*Weights on preliminary group not included because the tissues were fixed in Bouin's fluid for slides.
†Hypophyses weighed without fixation.
‡Ovaries and uteri fixed in formalin before weighing.

female rats (Fig. 3, I.G.H.) 2 each day for 3 successive days. A control injected similarly with hypophyses from ungassed males (Fig. 3, I.N.H.) and a noninjected littermate control (Fig. 3, N.C.) were run simultaneously. The female rats were autopsied 96 hours after the first injection. The assay was conducted in six series.

Fig. 3 presents positive visible evidence of greater enlargement of ovaries and uteri in all rats injected with hypophyses of gassed rats. Calculations from Table II show the ovarian increase to be 1.61 times and the uterine increase 1.32 times that in the controls injected with hypophyses from ungassed rats.

The mean hypophyseal weight in ungassed rats was 7.12 mg; in gassed rats 7.36 mg. The mean difference is 0.25 mg; each female injected with hypophyses of gassed rats thus received 1.5 mg more gland. Heller, Lauson, and Severinghaus[4] have shown 1.5 mg of hypophysis to produce no significant ovarian increase but positive uterine enlargement. The consistent ovarian and uterine enlarge-

[4] Heller, Carl G., Lauson, Henry, Severinghaus, Elmer L., *Am. J. Physiol.*, 1938, **121**, 364.

ment in our experiments proves a greater hormone content weight for weight in hypophyses of gassed rats.

Conclusions. 1. The combined testis and epididymis weight in rats is reduced about half after 50 or more one hour exposures to illuminating gas. The number of spermatozoa is greatly decreased and motility in the few viable sperm is impaired. 2. The hypophyses of gassed male rats become highly basophilic and many vacuolated castrate cells appear. 3. The gonadotropic hormone content of the hypophyses of gassed rats is increased.

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Myotonia Congenita in the Goat.

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In the course of conditioned motor reflex experiments on goats, we had the opportunity of observing so-called "stiff-legged" goats. Four such animals were furnished us through the kindness of Mr. D. E. Motlow, of Lynchburg, Tennessee.

It has been noted for years that animals of this strain, when startled, stiffen and fall over, remaining immobile for some seconds in what at first appears to be a general tonic spasm. Accordingly, they have commonly been labelled "nervous," "stiff-legged" or "epileptoid" goats.

Our investigations show, however, that this seizure is not a general tonic spasm produced by a special type of stimulus, but is caused by the failure of individual muscles to relax normally when strongly stimulated after a period of rest.

Stimulation of the motor points of the thigh with an adequate faradic current produces, not a simple twitch, but a tetanic contraction of the individual muscle or muscle group, with relaxation in from 5 to 30 seconds. On successive stimulation, the period of relaxation is progressively shortened until it approaches the normal twitch. Percussion of the muscle elicits a myotonic contraction of a few fibers, with characteristic slow relaxation.

These symptoms are accentuated by cold and by prostigmin (Roche), and are relieved by adequate doses of quinine.

These findings, together with the hereditary aspect of the anomaly, lead us to believe that we are dealing with Myotonia Congenita in the goat.