Mowry and Scott[10] who used toxic filtrates of *H. pertussis*. If, however, the final intravenous injection was performed with a live suspension of the organism after preliminary skin sensitization with the present antigen, a typical local erythematous response, later progressing to skin necrosis, was evinced.

Rabbits immunized by combined intradermal and subcutaneous injection of the antigen were capable of withstanding intravenous injection of $2x10^{10}$ virulent organisms—an amount which kills control animals of like weight within 20 hours. It did not seem likely that further protection experiments with animals not naturally susceptible to clinical whooping cough would yield information of any value. Therefore, after adequate experiments on the clinical and laboratory staff to demonstrate its harmlessness to humans, the antigen was subjected to clinical trial.

6808

Effect of Desiccated Beef Testis Upon Sex Glands of the Rat.

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The prostate gland of the rat shows a marked increase in weight in aged males.[1] McGee[2] and Gallagher and Koch[3] have shown that the testicular hormone of the beef testis is lipoid soluble. Moore and McGee[4] state that the lipoid fraction of the beef testis possesses the same activity as the internal secretion of the testis, judged by its effect on spermatozoa in isolated epididymes.

We have fed beef testis to mature male rats in an attempt to determine whether it might have any effect on the increase in weight of the prostate gland, as it tends to occur in the aging animals. The testes were ground and desiccated at 65°C., without removal of fat or extractives. The desiccated testis was then refrigerated and fed in 0.2 gm. amounts, 5 times a week.

The experimental animals gave no visible evidence of departure

[10] Mishulow, Mowry and Scott, *J. Immunol.*, 1930, **19**, 227.

[1] Donaldson, H. H., The Rat. Wistar Institute, Philadelphia. 1924.

[2] McGee, L. C., *Proc. Inst. Med. Chicago*, 1927, **6**, 242.

[3] Gallagher, T. F., and Koch, F. C., *J. Biol. Chem.*, 1929, **84**, 495.

[4] Moore, C. R., and McGee, L. C., *Am. J. Phys.*, 1928, **87**, 436.

from the condition of litter-mate controls. When sacrificed however, the testes, prostate gland and seminal vesicles were found to be considerably smaller than in the control animals. There was no contrast in the weights or gross appearance of the livers and spleens in the 2 groups. Table I presents the weights of the control rats

TABLE I.
Weight of Sex Glands of Control Rats.

Rat No.	Total Wt.	Testes and Epididymes	Prostate	Seminal Vesicles
	gm.	gm.	gm.	gm.
20	320	5.47	.49	.63
21	300	4.26	.46	.34
22	325	4.41	.38	.51
23	327	4.55	.66	.82
24	271	4.30	.54	.30
25	264	4.80	.41	.43
26	351	5.85	.61	.80
27	315	4.30	.84	.53
28	280	4.10	.75	.35
29	295	4.30	.75	.50
41	254	4.59	.33	.23
43	300	4.46	.20	.17
Average:	300	4.61	.535	.467
Fractional wt.:		0.015%	.0017%	.0015%

together with the weights of their testes with epididymes, prostate glands and seminal vesicles. The average weights of these organs are given and the fractional proportion of the average total body weight represented by each organ is stated. Table II presents the

TABLE II.
Weight of the Sex Glands of Experimental Rats.

Rat No.	Total Wt.	Testes and Epididymes	Prostate	Seminal Vesicles	Doses (0.2 gm.)	Days*
	gm.	gm.	gm.	gm.		
6	236	2.1	.15	.06	74	85
7	275	3.5	.33	.06	74	85
35	240	1.23	.095	.07	55	99
38	240	1.15	.10	—	55	99
39	245	0.30	.085	.05	68	114
40	245	1.55	.118	.04	70	117
46	340	1.68	.265	.10	55	99
Average:	260	1.64	.162	.063		
Fractional wt.:		0.0063%	.00062%	.00024%		

* Days intervening between first and last dose of desiccated testis.

same figures for the experimental animals, together with the number of doses of desiccated testis received by each and the period

over which the feeding extended. It will be noticed that the weight of the sex glands is considerably less in the experimental animals than in the controls. The difference in weight of the sex glands of the 2 groups is well shown on comparison of the proportionate weights of the glands to total body weights.

The atrophic appearance of the sex glands was most striking in those animals fed the desiccated testis over the longest periods of time. Apparently the duration of the experimental feeding of testis is of more importance than the equivalent dose given in a shorter period of time. Further experiments are in progress to verify this opinion.

An analysis of the histologic findings in the sex glands of the control and experimental rats is given by W. C. Hunter, as follows: "Histologically the prostate glands and seminal vesicles of all experimental animals display evidences of parenchymal reduction. The process has all of the characteristics of simple atrophy as shown by pronounced shrinkage in the size of individual glandular units, leading not infrequently to complete collapse of alveoli with a disappearance of the majority of cells and high grade atrophy of those still remaining. The epithelial cells are small, cubical rather than columnar in form and exhibit varying degrees of nuclear pyknosis. The stromal portion of both prostate and seminal vesicle is in every instance unchanged, indicating clearly that the reduction in size has been accomplished by atrophy and shrinkage of the glandular element. The changes described are much more pronounced in the rats fed the testicular substance over the longer periods of time."

"Similarly there seems to be a correlation between the duration of the experiments as regards the testicular changes in the various rats. The testicles of rats fed for a comparatively short time display no abnormalities on the part of either interstitial cells or those concerned with spermatogenesis. The animals fed testis for a longer period of time show aspermia and clear-cut evidence of degeneration on the part of certain cells, notably the spermatids and primary spermatocytes, thus accounting for the small size and condensation of seminiferous tubuli. The interstitial cells of Leydig show an increased density of nuclear chromatin and of lipochrome substance in the cytoplasm, but no quantitative decrease of cells."

Cryptorchidism with resultant atrophy of the testis does not figure as a possible explanation of the changes found in the sex glands since the testes were noted to be in the scrotum of each experimental animal at the time of beginning of the experiment and up to the time of its completion. Vitamin deficiency with the possible deleterious

effects upon the testes[5] was avoided through providing a food mixture known to be adequate and adding codliver oil, yeast, fresh greens and fresh meat.

6809

Chronaxie in Morphine Addicted Rats on High and Low Calcium Diets.

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Experiments by one of us (L. E. D.) have shown that the changes in water content of tissues and blood, and the characteristic symptoms accompanying morphine addiction and withdrawal in dogs and rats can be ameliorated by the use of a high calcium diet together with injections of "parathormone". This suggests a parallel with parathyroid tetany. In this latter condition there is little change in the chronaxie of motor nerves, but a decided increase in the chronaxie of skeletal muscles; this high chronaxie is, however, reduced to the normal by administration of "parathormone."[1]

To determine objectively, if possible, the difference in excitability of our rats on the calcium treatment and those not on the treatment, chronaximetric determinations were made. The composition of the diets was as follows:

	Diet No. 1	Diet No. 2
Whole Wheat	60%	63%
Casein	15	15
Whole Milk Powder	10	10
Alfalfa Meal	5	5
Butter	0	5
Calcium Lactate	5	0
Cod Liver Oil (fortified with ergosterol)	5	0
Sodium Chloride	0	2

The rats were first addicted by daily injections of morphine sulphate in doses increasing from 20 mg. to 50 mg. per kilo body weight over an interval of 2 weeks. At the chosen time each rat was decerebrated under ether anaesthesia, one sciatic nerve being

[5] Evans, H. M., and Bishop, K. S., *Am. J. Phys.*, 1922, **63**, 396.

[1] Parhon, C.-I., and Kreindler, A., *C. R. Soc. Biol.*, Paris, 1931, **107**, 398.