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.

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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.

used for peripheral stimulation, the other for central stimulation, the chronaxie being determined every 15 minutes during the second hour after decerebration when the readings had become constant. Three rats were used as controls on each diet, and 3 morphinized rats for chronaxie measurements on the last day of addiction, and 3 for each of the 3 days following withdrawal. In the tables each result is the average of 3 individuals. Thus in Table I the value .11 for peripheral stimulation in the control group

TABLE I.
Diet No. 1, "Calcium-treated Group."

Time after decerebration		Controls		Last Day of Addiction		1st day of Withdrawal		2nd Day of Withdrawal		3rd Day of Withdrawal	
						Average of 3					
		R	C	R	C	R	C	R	C	R	C
1 hr.	Peripheral	.52	.11	.66	.14	.84	.09	.50	.09	.31	.14
	Central	2.46	.12	1.60	.10	2.40	.08	1.50	.09	2.13	.10
1:15	Peripheral	.53	.09	.89	.10	.94	.09	.53	.07	.34	.12
	Central	2.65	.10	1.90	.10	2.60	.08	1.57	.09	2.25	.10
1:30	Peripheral	.53	.09	.95	.10	.94	.09	.57	.07	.38	.08
	Central	2.70	.09	2.10	.09	2.90	.07	1.63	.08	2.60	.08
1:45	Peripheral	.59	.09	1.30	.09	1.21	.09	.62	.07	.41	.08
	Central	3.00	.08	2.44	.09	3.60	.07	1.60	.08	2.60	.08
2:00	Peripheral	.64	.09	1.45	.09	1.81	.08	.62	.07	.51	.08
	Central	2.10	.08	2.59	.08	3.80	.06	1.67	.08	3.11	.08

R = Rheobase in volts.
C = Chronaxie in thousandths of a second.

TABLE II.
Diet No. 2, "Untreated Group."

Time after decerebration		Controls		Last Day of Addiction		1st day of Withdrawal		2nd Day of Withdrawal		3rd Day of Withdrawal	
						Average of 3					
		R	C	R	C	R	C	R	C	R	C
1 hr.	Peripheral	.56	.10	.34	.16	.36	.12	.26	.16	.26	.14
	Central	1.22	.11	1.03	.21	.56	.07	1.50	.10	1.10	.09
1:15	Peripheral	.64	.09	.48	.14	.46	.12	.35	.10	.26	.11
	Central	1.15	.12	1.18	.14	.55	.07	1.53	.07	1.33	.08
1:30	Peripheral	.72	.09	.43	.13	.58	.12	.43	.10	.33	.10
	Central	1.15	.09	1.41	.12	.58	.06	1.76	.09	1.60	.07
1:45	Peripheral	1.00	.09	.42	.12	.75	.13	.45	.08	.37	.08
	Central	1.38	.10	1.58	.11	.56	.07	2.00	.06	1.79	.07
2:00	Peripheral	1.65	.09	.50	.11	.76	.12	.50	.08	.41	.08
	Central	2.20	.10	1.58	.11	.59	.07	2.20	.06	1.91	.07

R = Rheobase in volts.
C = Chronaxie in thousandths of a second.

one hour after decerebration is the average of .11, .09, .14; the chronaxie of .12 for central stimulation is the average of .12, .12, .14; 2 hours after decerebration the value .09 is the average of .08, .08, .10 for peripheral stimulation and .08 is the average of .09, .06, .08 for central stimulation.

The chronaxie of control rats, i. e., non-morphinized, on high calcium diet and "parathormone" differed but little from those on low calcium diet. This is in contrast to the immediate effects of intravenous injection of a soluble calcium salt into the decerebrate cat, where the rheobase is raised and the chronaxie lowered.[2] On the last day of addiction both the "central" and "peripheral" chronaxies of rats on the high calcium diet and "parathormone" were slightly, but not significantly, lower than those of rats on the low calcium diet. During the 3 day period of withdrawal from morphine, the chronaxies were, if anything, slightly lower in practically every case, the differences again being hardly significant.

It may be said, therefore, that neither in normal rats nor in those subjected to morphine addiction and withdrawal does a diet rich in calcium and injection of "parathormone" significantly change the chronaxie of a typical motor nerve or of the flexion reflex.

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Standardization and Relative Purification Technique with Plant Virus Preparations.*

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The usual procedure in the preparation of an infective juice for inoculation or other experimental purposes, in the case of a virus like that of typical tobacco mosaic, consists first in thoroughly crushing or grinding the fresh tissue and then separating the coarser material by filtering off the clearer juice through cotton or cloth. Pressure also may be applied to the crude pulp. The crude juice thus prepared will contain the virus in what appears to be the original concentration. Often this procedure may be improved

[2] Woden, L.-J., *C. R. Soc. Biol.*, Paris, 1931, **106**, 462.

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