ized rats, follicles with small antra may develop, but usually show atresia. Large follicles quickly show atresia following the pituitary ablation.

The proneness of the hypophysectomized animals to collapse from hypoglycemia makes it necessary to follow their feeding closely and injections of glucose may not infrequently be necessary as is pointed out elsewhere.

The disabilities following hypophysectomy are so widespread that it is difficult to refer the delay in bleeding after oestrin withdrawal to any specific factor. There occurs the usual atrophy of the other endocrine organs and reproductive organs, a pronounced and constant drop in blood sugar and also a pronounced drop in blood pressure and in heart rate.

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Effect of Hypophysectomy on Blood Sugar of Rhesus Monkeys.*

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It has been demonstrated that hypophysectomy lowers the blood sugar in fasting dogs and rabbits. In dogs—the form in which sugar values are most extensive—the fasting blood-sugar values overlap those of normal animals and prolonged starvation is necessary to lower them to convulsive levels. Moreover, as recently demonstrated, the exposure of the hypophysis by the temporal approach, even though rapid, lowers the blood sugar nearly as much as does the removal of the gland (Chaikoff *et al.*[1]) The temporal approach has been used in the studies reported on blood sugar in hypophysectomized dogs.

The hypophysectomies here reported were done by the oral approach. The possibility of brain injury with the technique used is extremely remote due to the toughness of the diaphragma which is uninjured in the operation. In the animals reported as hypophysectomized the complete removal of the anterior and posterior lobes

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1 Chaikoff, I. L., Reichert, F. L., Larson, P. S., and Mathes, M. E., *Am. J. Physiol.*, 1935, **112**, 493.

of the pituitary was verified by a study of serial sections. The pars tuberalis was left intact. The material here reported is obtained from 24 normal, 9 completely and 3 partially hypophysectomized monkeys. The blood sugar of monkeys after hypophysectomy always shows such a pronounced drop that there is no overlap between the normal and operated animals after 16-18 hours starvation. Collapse due to hypoglycemia occasionally but not usually accompanied by convulsions which are never severe, happened frequently after 18 hours of starvation. This led us to reduce the fasting period to 16 hours. Even non-fasted animals may go into hypoglycemic collapse and have to be injected with glucose. Frequent and adequate feeding is necessary to maintain the hypophysectomized monkey. None of the 3 animals which were shown subsequently to be only partially hypophysectomized ever went into collapse.

The blood sugar was determined by the Somogyi modification of the Shaffer-Hartman method, reagent No. 1 being used. Each observation reported is the average value from 2 determinations on the same sample. The normal values were found to be about 10 mg. % higher in the ear than in heart blood which we attribute to the exposure to the air and accompanying concentration and also to the fact that in the drawing of this blood by this method done only in the earlier part of our work, the animals were subjected to more excitement.

The blood sugar values and their frequency distribution are shown in the accompanying chart and tables. In 3 animals which were partially hypophysectomized, the values are intermediate between those of the normal and completely hypophysectomized animals. In these cases not over one-fourth of the gland was left so far as could be determined by rough estimation from a study of sections.

In normal animals the fasting blood sugar values ranged from

TABLE I.
Blood Sugar Determinations on Heart Blood Taken 16 to 18 Hours After Fasting, Both Before and After Complete Hypophysectomy.

Monkey No.	Before Operation		After Operation	
	No. samples	Aver. mg. %	No. samples	Aver. mg. %
275	1	101	3	45
259	5	105	4	60
287	3	113	1	76
288	3	110	2	64
291	1	109	3	55
293	2	108	2	73

TABLE II.
Summary All Blood Sugar Determinations.*

	No. samples	Source blood	Aver. mg. %	ϵ	ϵm
		Normal			
Starved 18 hrs.	44	ear	120	19.6	3.0
" " "	53	heart	110	14.2	2.0
Fed	0				
		Incomplete Hypophysectomy			
Starved 18 hrs.	4	ear	93	—	—
" " "	28	heart	87	14.2	2.7
Fed	6	ear	112	—	—
		Complete Hypophysectomy			
Starved 18 hrs.	5	ear	66	—	—
" " "	33	heart	59	17.7	3.1
Fed	6	ear	94	—	—

*The formula $\epsilon = \sqrt{\frac{\Sigma d^2}{N-1}}$ was used, giving the mean deviation rather than the standard deviation (σ) because of the small number of cases studied. (Scott, *J. B. C.*, 1927, **73**, 81).

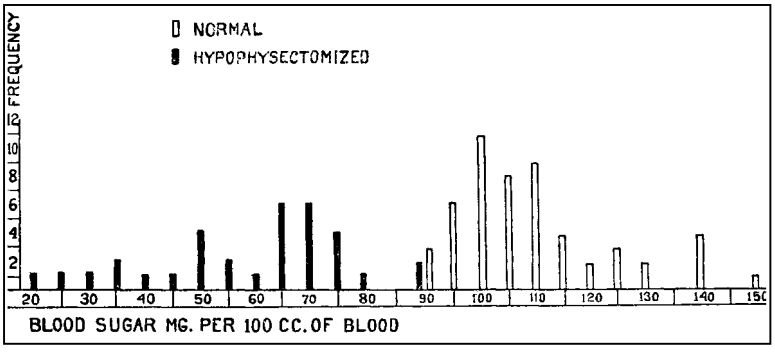

FIG. 1.
Distribution blood sugars of monkeys, starved 16-18 hours.

90 to 150 mg. %, while in the completely hypophysectomized animals the values range from 20 to 90 mg. %. The fasting blood sugar values of heart blood after hypophysectomy in the monkey average 59 mg. % (33 observations) while that of the normal animal averages 110 mg. % (53 observations).