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An observation of the effect of a protein meal given to a man at the end of an 8-day fast.

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In an observation of the effect of a protein meal on a man at the end of an eight day fast a rather unexpected result was obtained which throws light on the fate of the carbohydrate portion of the protein cleavage products.

The subject was a normal man, 23 years old. Height 180 cm., weight 70.4 kgm. At the time of observation he had a marked odor of acetone on his breath. Respiration was normal. The CO₂ combining power of the blood plasma was 50 volumes per cent.

He was placed in the respiration calorimeter for a basal observation of 2 hours. He was then given a meal which consisted of 350 gm. of lean beef and 10 gm. of butter. One hour after taking the meal a second observation was started and continued for 3 hours. During the first two hours of this latter observation respiratory quotients were obtained of .687 and .681. During the third hour the quotient was .740. The first two quotients are similar to those found in severe diabetes, or in phlorhizin glycosuria. During the basal periods the quotients were normal for the fasting state, .733 and .723 respectively. Following the meal there was very little increase in heat production. The nitrogen excretion was not increased.

As evidence that the subject was not diabetic his tolerance for 100 gm. of glucose was normal. The fasting level for blood sugar was .086 per cent. After glucose it rose to .137 per cent. There was no glycosuria.

One week after the first observation the experiment was repeated. During the interval the subject took a normal diet. The basal heat production was lower, as was the basal nitrogen excretion. After the meal a marked rise in heat production oc-

curred (17-28 per cent.), but the hourly heat production is practically the same after the meal as it was in the first observation. The nitrogen excretion was much increased after the meat. The quotients are normal throughout and higher than after fasting.

The explanation of the diabetic respiratory quotient has been made by Lusk¹ who estimates the amount of oxygen and carbon dioxide exchanged in respiration for each gram of urinary nitrogen in severe diabetes ($D : N = 3.65$). In the case of a dog with phlorhizin glycosuria, and the cases of two diabetic men, diabetic quotients were obtained, but non-protein quotients were found to closely approximate that for fat. In the present case the non-protein quotients are below that for fat, due to a failure of all of the nitrogen metabolized to appear in the urine.

It seems probable that the diabetic quotients in this case were obtained by the same mechanism as in diabetes, except that the glucose instead of being excreted in the urine, was stored as glycogen.

TABLE I.

EFFECT OF 350 GM. MEAT ON A FASTING MAN, AGE 23, WT. 70.4 KG., HT. 180 CM.

Hours.	Before—Basal.		Eating.	After.		
	1.	2.	3.	4.	5.	6.
CO ₂ gm.	22.92	22.46		23.02	23.73	24.34
O ₂ gm.	22.73	22.60	PROTEIN	24.38	25.36	23.91
R.Q. . . . .	.733	.723	70 gm.	.687	.681	.740
N. per hr. . . . .	.639	.639	FAT	.637	.637	.637
Cals. per hour	73.85	73.36	28 gm.	78.77	81.98	77.89

Observation 391 made at the end of an 8 day fast.

TABLE II.

BEHAVIOR OF THE SAME INDIVIDUAL ONE WEEK LATER, HAVING BEEN ON A NORMAL DIET IN THE INTERVAL.

Hours.	Basal.		Eating.	After.		
	1.	2.	3.	4.	5.	6.
CO ₂ gm.	20.67	20.88		23.89	26.60	25.97
O ₂ gm.	19.09	19.53		22.82	24.96	24.91
R.Q. . . . .	.788	.778		.762	.775	.758
N per hr. . . . .	.599	.599		1.020	1.020	1.020
Cals. per hour	62.81	64.11		74.08	81.38	80.98

The same meal was given after a basal observation.

¹ Lusk, Graham, "On the Diabetic Respiratory Quotient," *Arch. Int. Med.*, 1915, 15, part II, p. 939.

TABLE III.

	CO ₂ gm.	O ₂ gm.	Calories.
In diabetes 1 gm. urinary N =	4.00	4.56	13.04
In periods 4-5, 0.637 gm. N =	2.55	2.90	8.31
Period 4. Total	23.02	24.38	R.Q.
Deduct for N	2.55	2.90	.687
Non-protein	20.47	21.48	.693
Period 5. Total	23.73	25.36	.681
Deduct for N	2.55	2.90	
Non-protein	21.18	22.46	.686
Compare with	D : N	R.Q.	Non-protein R.Q.
Phlorhizinized dog	3.54	.687	.704
Diabetic man G. S.	3.5	.697	.700
Diabetic man C.K.	3.97	.687	.699

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Experiments on a quantitative and qualitative test for anti-beriberi vitamine.

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In 1912 one of us (C.F.) experimented with the anti-beriberi vitamine to see if it could not act as coferment in alcoholic fermentation. The experiments failed at that time, but now the subject through the work of Williams, Bachmann and Eddy has attained a new interest. Their results seem to prove that vitamine activity can be measured by growth of yeast cells and would permit of dispensing with animal experimentation in the initial stages of vitamine fractionation.

Because of the uncertainty of the Bachmann fermentation test, and the complicated procedure of Eddy's test, it was thought desirable to develop a simple macro method. Our procedure is as follows: A yeast suspension is prepared according to the method of Eddy by shaking a loopful of 48 hours yeast culture in a definite amount of Naegeli's solution for 4 hours on a shaking machine. Duplicate tubes are then prepared containing: (1) yeast suspen-