twice the amount present in the nitrite, this value is divided by 2. The number of milligrams of nitrogen so calculated is multiplied by 0.9286 (the ratio of potassium to nitrogen in the $K_2NaCo(NO_2)_6$ precipitate) in order to obtain the value for potassium in milligrams per 100 cc.

[1] Kramer, B., and Tisdall, F. T., *J. Biol. Chem.*, 1921, xlvi, No. 2, 339.
[2] Clausen, S. W., *J. Biol. Chem.*, 1918, xxxvi, 479.
[3] Frankland, P., *J. Chem. Soc.*, 1888, liii, 364.

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The Metabolism and the Respiratory Quotient of Excised Renal Tissue.

HENRY B. RICHARDSON, ROBERT O. LOEBEL* AND EPHRAIM SHORR.

From the Russell Sage Institute of Pathology, Department of Pathology, Bellevue Hospital, New York City.

The respiratory quotient of the excised renal tissue of the rat was determined by the Warburg-Barcroft manometers. The accuracy of the method was judged by duplicate quotients, performed with the same tissue, at the same time. The results are recorded in Table I, columns 1 and 2. The average of each pair is given in the third column, and the numerical difference in the fourth. The series was consecutive, and only those observations discarded in which technical error could be demonstrated. Observation 7 is excluded from the averages; a technical error was probable, but not proved. With this exception, the mean difference was 0.027, and the error ± 0.014.

The data include observations on well-fed, as well as fasting rats, with or without glucose in the fluid. Variations in the results would therefore be expected. The lowest observation was 0.705, which happens to be the theoretical quotient for fat. The highest was 0.949, which does not exceed the level of the exclusive oxidation of carbohydrate. In 19 out of 25 observations the quotients were between 0.750 and 0.899. Thus all the experiments fall within the limits which we should expect to find in the intact organism, even when there is no reason to suspect the formation of fat from carbohydrate, or the reverse. The results imply that excised tissue,

* Fellow, Natural Research Council.

TABLE I.
Duplicate One-hour Quotients; Glucose in Medium.

(1)	(2)	Average (3)	Difference (4)
Fed.			
0.820	0.813	0.817	0.007
0.847	0.823	0.835	0.024
0.760	0.788	0.774	0.028
0.688	0.721	0.705	0.033
0.822	0.802	0.812	0.020
0.845	0.872	0.858	0.027
0.907	0.774		
0.894	0.836	0.865	0.058
0.869	0.819	0.844	0.050
0.796	0.768	0.782	0.028
0.792	0.800	0.796	0.008
Fasted.			
0.861	0.876	0.868	0.015
0.949	0.938	0.944	0.011
0.887	0.843	0.865	0.044
Average			0.027

though deprived of nerve connections and circulation, utilizes the same proportion of foodstuffs as the intact organism. Evidence of the conversion of one food-material into another was lacking.

Our earlier experiments raised the question, whether or not excised renal tissue could make use of the glucose offered it in Ringer solution. To answer this query, simultaneous observations were made, with and without glucose in the medium. The results are recorded in Table II. With glucose, the quotients were invariably higher, and the difference far exceeded the experimental error. The

TABLE II.
Simultaneous Respiratory Quotients, with and without Glucose in Medium. Two-hour observations.

Without Glucose	With Glucose	Difference
Fed.		
0.830	0.900	+0.070
0.824	0.872	+0.048
0.816	0.867	+0.051
0.820	0.884	+0.064
Av. 0.823	0.881	+0.058
Fasted.		
0.811	0.898	+0.087
0.805	0.878	+0.073
Av. 0.808	0.888	+0.080

average increase was 0.058. In two experiments the same procedure was carried out after 3 days of fasting. The results did not differ from those obtained after food. In either case the presence of glucose caused an increase in the quotient, which may be attributed to the oxidation of sugar.

CONCLUSIONS.

1. It is shown by complete double respiratory quotients that in the case of renal tissue, the error of the Warburg-Barcroft manometers is, on the average, ±0.014.

2. The quotients were all between 0.7 and 1.0, and are fully accounted for by the oxidation of foodstuffs, without postulating the transformation of one into another.

3. As evidenced by the rise in the respiratory quotient, isolated tissue can oxidize glucose offered it in solution.

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Removal of Inhibiting Effects on Nitella of Certain Buffer Mixtures and Acids.

MARIAN IRWIN.

From the Laboratories of The Rockefeller Institute for Medical Research.

Living cells of *Nitella* (collected in New York in autumn) were exposed[1] for 10 minutes to (1) M/150 phosphate buffer solution at pH 5.5, (2) 5×10^{-5} M phosphoric acid[2] (at about pH 4.3), and (3) 5×10^{-5} M hydrochloric acid (at about pH 4.2), and then placed in a solution of brilliant cresyl blue.[3] The rate of penetration of dye into the vacuole, as compared to that of the control (cells transferred from tap water into the dye solution), was found to decrease about 50 per cent in (1), 37 per cent in[4] (2), and 25 per cent[5] in (3).

This inhibiting effect was not removed when cells, previously exposed to the solutions above mentioned, were washed for ½ minute either in M/150 phosphate buffer solution at pH 7.7, or in M/150 borate buffer solution at pH 7.7 containing 0.02 M sodium chloride. In the latter case there was a greater inhibiting effect. The inhibiting effect of hydrochloric acid and phosphoric acid was very slightly reduced while that of the phosphate buffer mixture at pH 5.4 was