and in which there is great distress should suggest a bilateral one. The advisability of aspirating both pleural cavities was considered. Aspiration of the right side, however, gave sufficient relief on both occasions, and it was decided to leave well alone and to avoid all unnecessary interference which might increase the risk of infection. There is no doubt that aspiration saved the patient's life. It seems remarkable that both lungs finally expanded without any complication such as effusion or infection.

We are indebted to Dr. G. E. S. Ward for permission to continue our observation of this case while under his care, and to record it.

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NEW ANALYSES OF CARBOHYDRATE FOODS AND THEIR APPLICATION TO DIABETIC DIETS.

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ANYONE who has taken the trouble to compare the carbohydrate content of foodstuffs given in different food tables must have been struck by their divergencies and contradictions, often amounting to several hundred per cent. It therefore seemed essential to investigate the subject further if any degree of accuracy in dietetics, and especially diabetic diets, was ever to be obtained. Fresh analyses have therefore been carried out and the results published.¹

In the past compilers of food tables have largely failed to differentiate between (a) starch and the soluble sugars which are completely available as such for metabolism, and (b) other carbohydrates such as cellulose, pentosans, inulin, which are certainly not available as carbohydrate and whose exact value in nutrition is doubtful. By our methods of analysis we have separated these two groups, and our final tables show the carbohydrate physiologically available for metabolism. Some of the new figures differ greatly from older ones, as the following comparison shows. The older figures are taken from food tables² prepared by Harrison and Lawrence in 1923 from the sources then available. The figures give the percentage of carbohydrate in foods as eaten.

	Percentage Carbohydrate.	
	Old.	New.
Cabbage	2-3	1.0
Celery	3.5	1.0
Lettuce	2.5	0.7
Olives	9.0	0
Rhubarb	2.5	0.6
Strawberries	9.0	4.4
Tomato	4.0	2.4
Beetroot	7.0	8.0
Potato	20.0	19.2
Bread	50-55	50-55

It will be noticed that great changes appear in most vegetables and fruits, in which much of the total carbohydrate has been found to be "unavailable." On the other hand, the new and old figures agree in foodstuffs rich in the available carbohydrates (sugar and starch), such as beetroot, bread, and potatoes.

Application to Diabetic Diets.

These new analyses explain the specific effect that has been attributed to green vegetables in the treatment of diabetes. Thus when a patient confined himself for a day

or two to green vegetables instead of their supposed equivalent of bread or rich carbohydrate food, the glycosuria disappeared. This was because the available carbohydrate was much lower than was supposed.

In practice, therefore, diabetics may always be allowed large amounts of green vegetables, enough to satisfy the most voracious appetite. Moreover, it is quite unnecessary to boil vegetables three times, as was often done in the past, because they contain so little carbohydrate after ordinary domestic methods of cooking. It will be possible in future to make the carbohydrate content of diabetic diets more uniformly accurate, and consequently treatment, and especially experimental therapeutic investigations, may be made more accurate also.

Changes in the Line Ration Diet.

These new food values for carbohydrates have already been incorporated in the line ration diet cards introduced by one of us in 1924,³ and in the last edition of *The Diabetic Life*.⁴ Indeed, some confusion for patients and doctors using the scheme has been unavoidable, as new figures have from time to time been substituted for old as analyses became completed. However, the basis of the scheme is unchanged, and each line still contains 5 grams of carbohydrate, $7\frac{1}{2}$ grams of protein, and 15 grams of fat. The protein and fat food values remain the same, and many of the richer carbohydrate foods, such as bread and potatoes. But practically all the amounts prescribed of green vegetables and many fruits have been increased. The values for such articles as cabbage, spinach, cucumber, and tomatoes have been doubled because the carbohydrate content is about half what we supposed in 1924. A few others, such as lettuce, asparagus, and rhubarb, have been found to contain so little carbohydrate that they have been allowed as "extras," because average helpings contain a negligible amount of carbohydrate.

Naturally the patients are getting more carbohydrate than before, and some have required a few more units of insulin. Depending on the foods chosen by the patient, the increase in carbohydrate now allowed is from 30 to 60 per cent., calculated on old food values. Thus the amount of carbohydrate now allowed in a diet of ten lines (50 grams of carbohydrate) may equal 65 to 80 grams when worked out with previous food values. This increase is probably better for the patient and conforms with the general tendency to increase the carbohydrate in diabetic diets. It has had the effect of reducing the amount of acetone bodies in the urine of patients using the line ration scheme. The ratio of carbohydrate to fat in this scheme was originally intended to be 1 to 3, just high enough to allow complete combustion of fats to proceed. In practice, however, complete combustion was seldom obtained, as Rothera's test was frequently positive in the urine. This was because less carbohydrate was being given than was supposed in theory. The introduction of the new values has corrected this, and the patients' urines are now more consistently free from traces of acetone bodies.

It may be of interest to see how our new figures apply to other schemes of diabetic diets. MacLean's⁵ "fifth day" diet contains 42 grams of carbohydrate, but on our new reckoning only about 26 grams. Similarly, some of the sample meals given by Joslin⁶ as containing 10 grams of carbohydrate contain only about 5 grams. And working out a ten-line diet (50 grams of carbohydrate) containing much vegetable by the food values given by Joslin (the standard figures used in America) gives a carbohydrate content of 94 grams—admittedly an extreme example. It is interesting to note that Joslin now aims at giving even his severe diabetics 80 to 100 grams of carbohydrate a day—amounts the same as the line ration scheme when the different food values used are considered.

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