still undecided. Gatterbauer's osazone was produced from an admittedly impure product, and Browne himself states elsewhere:[1] "The fact that maltose in presence of impurities gives an osazone of the same melting point greatly lessens the value of the osazone test for isomaltose."

It is well recognized by those who have given attention to dietetics that all sugars capable of being fermented by yeast into alcohol and carbon dioxide can be completely digested and utilized as a source of energy by the human body. It thus follows that other carbohydrates which can be converted into fermentable sugars by enzymes normally present in the human body can also be completely utilized by it as an article of food. It is a well recognized fact that starch when properly cooked and brought into a condition suitable for the action of the enzymes of the body is practically all digested. Such authoritative works as the *Encyclopedia Britannica*, in an article based as stated, upon a compilation of about one thousand actual digestion experiments, puts the digestibility of starch and sugars at 98 per cent. and of carbohydrates of corn meal at 99 per cent. Our critic makes some facetious remarks about our not having reviewed the literature, but he has himself apparently overlooked a very important piece of literature on the digestibility of commercial glucose, and fails to mention the article by Sansum and Woodyatt on "The Use of Phlorhizinized Dogs to Determine the Utilizable Carbohydrates of Glucose."[2] In this article they compared the digestibility of pure *d*-glucose with the dry matter of commercial glucose when administered to dogs which had been completely phlorhizinized, and by means of which it is possible to show the utilisability of food products administered to the animals thus treated, by measuring the total yield of sugar in the urine of the animal to which it was administered. In this paper, the authors, from a very conservative interpretation of the results of their several experiments, put the digestibility of the dry matter of commercial glucose as at least 95.48 per cent that of pure *d*-glucose.

It is our opinion on reviewing the details of their tabulated results that it would be entirely fair to accept the digestibility of one as 100 per cent that of the other, for such is clearly shown in at least 3, and possibly 4, out of 5 trials. In one of the five trials, *d*-glucose was administered subcutaneously and the results were abnormally high. This would be expected in that *d*-glucose is a natural blood sugar and, therefore, would not have the opportunity of undergoing changes in the circulation, such as would take place in the gastro-intestinal tract when it is fed by the mouth. It is, therefore, our opinion that this trial should not be included in arriving at the average of the digestibility. In all other instances the foods were administered by the mouth, and in one of these the results for commercial glucose was comparatively low, such as would indicate it to be due to some abnormal cause. Both of these abnormal results were included in the averages given by the authors. If they had been omitted, the averages for commercial glucose would have been even slightly above that for pure *d*-glucose.

Browne in his criticism makes some reference to the winter feeding of glucose to honey bees, which he endeavors to connect with the digestibility of that article. We fail to understand in what manner it has any bearing upon the question. We are not fully able to understand just why the range and nature of the digestive power of the honey bee has any important bearing upon the digestibility of food for man. We know very well that beefsteak or bread and butter or baked potatoes are not much sought after by honey bees except for the small amount of saccharine matter or moisture which might be extracted from them, and we well know that no apiculturist would think of attempting to give these to his bees to utilize for their winter food. We think it very probable that the large amount of dextrins in commercial glucose would not make it exactly an ideal food for the honey bee, although we know that some honeys contain a considerable quantity of dextrin. Through the kindness of the *American Bee Journal*, we have a report of some letters published in that journal on winter feeding of glucose to honey bees, and it was the opinion expressed in those letters that many of the bees which ate of the glucose became affected with dysentery. There does not appear to have been any systematic study made as to the cause of this, but it was suggested in one of the letters that the glucose contained too much acid. These letters were published in 1879 when the glucose industry was in its infancy and at that time sulfuric acid was used as a hydrolyzing agent, and sodium bisulfite was also used, and we know that should the glucose have retained any sulfur dioxide, this would have been very detrimental to the delicate digestive organs of the honey bee. At all events, the data at hand does not make it a very strong argument for any purpose, and we are very much surprised that a man who is familiar with the chemistry of sugar, commercial glucose and honey, should have attempted to make use of it in this connection.

Our statement that "In this respect, glucose pound for pound of dry weight will furnish at least as much energy as does cane sugar" was made advisedly after a careful consideration of all points which to our minds were in any way involved in it. We were not unmindful of the fact that commercial glucose contains as a part of its dry substance a small quantity of protein and mineral matter. We also understood thoroughly that when cane sugar and a part of the constituents of commercial glucose undergo hydrolysis, certain molecular changes take place which make these of different caloric value when used as a source of energy for the animal economy, and because of these changes a slightly lesser amount of dry matter in the commercial glucose is over-balanced by a slightly greater amount of caloric value of energy, which because of the complex nature of the molecule (polysaccharid) have a greater concentration than does the simpler and more completely hydrolyzed *d*-glucose into which they are finally converted.

We, therefore, have made use of the composition of commercial glucose as found in our analyses in connection with the well-known caloric value of each constituent part, and from these have found the caloric value of the whole and have compared it with the caloric value of cane sugar in the manner shown below:

COMPARATIVE CALORIC VALUE OF COMMERCIAL GLUCOSE AND CANE SUGAR

Glucose Constituents	Per cent	Caloric Value	Calories per Gram(*a*)
Destrose	14.5	543	3743
Maltose	19.6	774	3950
Dextrins	46.3	1904	4112
Total	80.4	3221	....
Calculated to Cane Sugar	100	4006	3955

Cane Sugar energy in per cent of Glucose energy, 98.7 per cent

(*a*) *Chemie der menschlichen Nahrungs- und Genussmittel*, II Band, Seite 284.

It thus appears that from the standpoint of energy, we still have a slight margin in favor of the dry matter of commercial glucose, even after allowing for the small amounts of protein and mineral matter present.

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CEMENT MILL POTASH—CORRECTION

In the article under the above title [THIS JOURNAL, 9 (1917), 646] the following corrections should be made:

Page 647, 3rd table, first line of 3rd col., "K_2O (Total) 1.33%" should read "K_2O (Total) 11.33%."

Page 650, 1st col., last word of fourth line under center head "Effect of Soil Admixture"—"soluble" should read "insoluble."

R. J. NESTELL AND E. ANDERSON

[1] "Handbook of Sugar Analysis," first edition, first thousand, page 707.

[2] *Jour. Biol. Chem.*, **26**, No. 1, Jan., 1916.