Comments and Communications

On the Use of Cellulose in Diets

Recent comments by F. Hoelzel and A. J. Carlson (*Science,* December 19, 1947, pp. 616–617) on the practice of adding cellulose to experimental diets at the expense of glucose included remarks pertaining to a paper by us on the growth-promoting action of cellulose in purified diets for chicks (*J. Nutrition,* 1947, 34, 295).

With respect to our paper, we wish to present the following points which Hoelzel and Carlson apparently overlooked:

(1) "Ruffex," a roughage material derived from rice hulls and containing 70% alpha cellulose, was used exclusively in our experiments rather than "Cellu Flour," which is obtained from purified and bleached wood pulp, straw pulp, or cotton fiber (*Conn. agric. exp. Sta. Bull. 127,* 1921, p. 230). The source of cellulose may be a consideration, as preliminary experiments with cotton flock supplemented at the expense of glucose did not give statistically significant increments of growth when compared with chick control groups.

(2) Since the greatest growth response was obtained with just 5% of cellulose rather than with the higher levels, it is hardly conceivable that the results we obtained were due to the very slight increase in the proportion of protein, minerals, fat, or vitamins to the glucose portion of the diet. Ample levels of protein, fat, minerals, and vitamins for the chick were present in the basal ration. Our evidence, in addition, did show that at least part of the cellulose was utilized by the chick.

(3) As Hoelzel and Carlson pointed out, and as is very obvious, the available carbohydrate portion of the ration is reduced when cellulose is fed at the expense of glucose. We were aware of this important consideration and pointed out in our discussion (p. 299) that the "retarded growth and lowered feed efficiency values with the feeding of the 20 percent through 50 percent levels of cellulose were probably caused by a decrease in the availability of metabolizable simple carbohydrates, since the supplements were fed at the expense of glucose." The excellent feed efficiency values obtained with the diets containing the lower levels of cellulose indicate that sufficient utilizable carbohydrate was available (all diets were fed *ad libitum*) in these cases.

(4) That there is also a very real disadvantage in adding cellulose to the complete ration (not at the expense of any nutrient), especially in studying the higher levels, is pointed out by a recent paper by E. F. Adolph (*Amer. J. Physiol.,* 1947, 151, 110). He reported that rats, fed diets in which cellulose and other forms of bulk were added to a complete diet, ingested more bulk but stopped before they ingested a full quota of nutrients. "The limited ability to handle roughage in the alimentary tract then became a factor in the animal's urges to eat."

We feel that the interpretations of the results we obtained were justified from the data given, and that the growth-promoting action of cellulose ("Ruffex"), or its decomposition products, which we obtained with chicks was due to other reasons than the very slightly altered proportion of nutrients in the diet.

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On Literature Citation

The desirability of references to scientific literature in a published article is not under dispute. There are differences of opinion, however, as to how these should be cited to be of benefit to the reader.

There are three main objects in citing references: (1) to give credit to the original author of a method, theory, process, or other innovation; (2) to tell the reader where to find more information on the subject under discussion; (3) to define the basis of published works on which inferences are drawn. The first of these objects is fully accomplished by citing the author and the location of the original work in scientific literature.

The achievement of the second object depends on circumstances. If the author wants to lead the reader to broader treatment of the point under discussion, he has before him the choice of referring to the abstract which he consulted and found helpful or of citing the original publication, which he may or may not have consulted. Unless the original was studied and is easily available, the reference to the abstract journal should be stated with or without an additional reference to the original.

The reader can easily look up the abstract referred to and then decide whether to proceed further. If he finds a reference only to the original, he has the burden of digging through the abstract indexes to learn what the author has learned and could have presented to the reader at the cost of only the reference entry.

The following incident, which actually occurred, illustrates a questionable practice in presenting bibliographical references. A report was received which, in the bibliography at the end, referred to publications in French, German, Japanese, Russian, Indian, and Polish journals but did not refer to the abstracts of the articles. The apparent implication was that the author read the originals or their translations and based his conclusions on an extensive polylingual study. The reader was not helped much by the bibliography except, perhaps, in judging the basis of statements leading to the conclusions, and thereby the third object of citing references was fulfilled.

In general, it is good practice for the author to refer exactly to the journal which he consulted and not necessarily to the original publication quoted there. Unquestionably, reference to the original can be helpful in spe-