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SHOULD OUR DEFINITION FOR SUGAR BE BROADENED—
IF SO, WHY? *

BY L. E. SAYRE.

If, as Horatio C. Wood says, for more than ten centuries sugar remained a curiosity and was used only as a medicine, any definition that has any harking back to that time would certainly need furbishing up in this the twentieth century. Merely physical, eye-discerned attributes of the substance necessarily made up a part of any description, while taste and utility certainly entered into any early description of sugar. Evidently, in the lapse of time, there has been ample opportunity for a broadening of the definition and uses of sugar.

Scientific broadening is a self-progressing every-day occurrence; when the occasion arises and necessity of recognition dictates, new incontrovertible facts are welcomed and applied by every worker practically there and then. It is not necessary to hold a meeting and resolve, for if it were well done it would have to be done quickly.

In popular broadening, the task is harder. The adage that you can't teach old dogs new tricks applies to the weaning and diverting of the opinions of the masses. The hardest thing to do, perhaps, is to let them know that there is more than

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one sugar; for the most part they will assert that they "know better." The man from Erin, who, when informed that there was a vast difference in the quality of whisky, opined that there might be different kinds but that there wasn't any *bad* whisky, would not be so tractable in the matter of sugar. He would acknowledge it in all its varying physical forms, but you could not persuade him that a powdered solid glucose was a sugar—to him it would be a "fake" and a "holdup." A certain amount of education must accompany the effort of introducing other sugars with a less intensive sweet taste. It would do little good to endeavor to try to make him understand that sucrosium would have to become dextrosium before it would do his body any good—that his animal economy must invert that sweet sugar from mere sweet taste to a less sweet practical nourishment as a food substance.

Definitions are dangerous things—they have to be watched. One-man-power definitions especially. Very rarely is a single individual competent to assume such dictatorial authority or to be invested with such a power. It is from the counsel of many that standards should be derived. It is in that light that this query is launched. The writer has had to deal with sugar from a more or less public standpoint quite recently and the practicability of a broadening was impressed upon him as having to come from the discussers of the scientific side of the question. It must be the fruitage of reason, not sentiment. In the course of half a century the products to be considered have changed; their sources, even, in some cases. The chemistry involved has advanced from questionable surmises to firm grounds of demonstrable correctness. The pharmaceutical side of the thesis will have its weight in final decisions. While there should be no breaking down of barriers of safety—the discoveries and results of modern factories in producing new and perhaps cheaper sugars should be welcomed and respected. If old definitions are insufficient, unjust, or trammeling, surely we are able to correct any well-intended mistakes of the past which new light may point out. But there must be no partisanship or interest allowed to warp judgment. If commerce offers new products which require new definitions or the revising of old ones, let us accept the new things and remove old obstacles.

Corn sugar as applied to mean the final product derived from the starch of the seed from the cob of the Indian corn—field corn—maize, is entirely different from the idea of corn sugar as originally produced and described and named in the patent records of 1841.

A loose handling of the term corn sugar in 1924, which would invite the partisan of an interested side *not* to protest, might indicate that the loose description was a sort of acceptable propaganda, or at least a temporizing with a difficulty that must be surmounted in a final agreement concerning the verbiage of an official definition.

Corn sugar in 1841 meant the sugar obtained from expressed field cornstalk juice. The juice when concentrated yielded a granular sugar and a molasses in the same way as sugar cane does. The government document of the time refers to the product as being equal to that of cane and beets, while in quantity produced it was "three times as great as in beets."

If the definition for sugar as given out by the United States Department of Agriculture from its Secretary's office is a peremptory finality the wonder grows

why it was with forethought applied to a product *known as something else*. With no change whatever, without taking out a word, let us read as it might preferentially be read to secure its best application.

The reading of the circular is as follows:

"Sugar is the product chemically known as sucrose (saccharose) chiefly obtained from sugar cane, sugar beets, sorghum, maple and palm."

Now, commence with the third word of the descriptive paragraph, accepting the full significance of the words "known as" and see what can be made of it: "The product chemically known as sucrose (saccharose) chiefly obtained from sugar cane, sugar beets, sorghum, maple and palm, is sugar."

If a product is chemically known and identifiable as sucrose its main name must be sucrose and sugar its inducted commonplace synonym; no chemically bestowed knighthood is necessary to make it sugar.

If sucrose is sugar, is not lactose also sugar? And dextrose and maltose? And inosite the regal sugar that biologists are paying large prices for? Applying the same train of thought, does not glucose carry a varying lot of nameable sugars? Really and truly ought the title sugar be limited in application to any one of many chemically known products from natural sources?

It is asserted by those most interested that the U. S. Department of Agriculture in the defining of sugar, with an imperial gesture, waves aside all bodies other than sucrose. It is maintained by those objecting to the impassable barrier of exclusion thus raised that the term *Sugar* should not be an excluding title but an embracing receptive one.

That "sugars" should be valued and described under their definite chemical subtitles when possible and each have its definition.

That the word "sugar" should not be held as describing a single omnipotent body, but a class in which all saccharine-like substances would find their niche.

The quality of sweet-tasting carbohydrates alone would give to other bodies than those obtained from the juices of *saccharum officinarum* and *betæ* places under a collective title of "Sugar."

The World War had much influence in the creation of standards and an appreciation for rational obtainable substitutes (in the form of self-applied restrictions) of cane sugar. A dozen years ago a great many families made their own table syrups from granulated sugars and flavors; an intense sweet was the desire—the maple syrup of the market, for instance, was usually a half strength masquerader. The housewife could juggle with an artificial maple flavor and make more satisfying syrups. When limitation was imposed on cane and beet sugar, the manufacturers' dextrose and sorghum compounds were put into use. The public palate permitted itself to be let down an octave or so in a sugar inversion scale and strange as it may seem that familiarity with the "less sweet" things has become a part of the domestic economy of to-day. The manufacture of the syrups from maize starches and malt-made sugars is greater than ever before. There is certainly a desirable trend to the consumption of dextrose syrup and sugars. People are rejecting the cloying over-sweetness of the once highly esteemed cane-sugar-made delicacies of the breakfast table much to the benefit of their kidneys and their stomachs. In this one direction it is evident that the definition for sugar might be broadened without much protest.

The coming Pharmacopœia is to have some slight changes in the nomenclature of the various sugars. The broadening of a definition of sugar is a possibility if the term "sugar" is to be thought of as a class name and the chemical bodies, saccharoses, varying in sweetness, composition and properties as members of the class. The pharmaceutical use of sugars may involve the use of a selected body or the blending of several. Greater freedom in expression and practical use is desired. The term "saccharated" even in old practice meant nothing very definite. Saccharated carbonate of iron utilized cane sugar, but saccharated pepsin did not—in these it was not a matter of taste; it was preservation-insurance that was invoked. Saccharate of lime used cane sugar as a chemical and furnished lime in a new assimilable form not attainable in the usual calcium salts. Dover's powder required milk sugar largely as an inert vehicle for dose subdivision; and, it must not be forgotten, cane sugar has been used in Dover's powder as an assisting abradant, perhaps, of store-powdered opium in the same way that saltpeter was used for the purpose in still earlier days. Sugar then meant not "a" fixed type sugar but "the" special sugar needed. The broadening has been, ferment-like, affecting the Pharmacopœias as they succeeded each other. The new Pharmacopœia X may embrace in its index lactosum, sucrosum, dextrosum; perhaps when a masking intensity of sweet taste is wanted a sugar will not be employed at all, while, likely, the chemical benzosulphinidum, synonymized suggestively as "saccharin," will be employed, even if it has no food value whatever and is perhaps detrimental to the healthy organism when used in place of edible sugars. The trifling amount of saccharin necessary in a given dose of a medicine is negligible and the partaker of a saccharinated castor oil may smack his lips and safely survive its administration.

It may be added, finally, that among the supersweet sugars there is one, recently announced, composed of the common elements of foods. This compound, we are told, by *Daily News Service News Bulletin* (Washington, D. C.), has a marvelous sweetening power (one part equals in sweetness about 2000 parts of common sugar). It is chemically rejoicing in an almost unpronounceable name which, it is hoped, organic chemists will endeavor to shorten and make fully as intelligible.

INSECTS AND MEDICINE.

An exhibit of insects having a relation to medicine and diseases, in the zoological department of the Vienna Museum of Natural History, comprises about 6000 specimens. Concise explanations are given of the specimens and photographic enlargements accompany the organisms, invisible to the eye. The exhibit is divided into six groups and shows which of these organisms exerts a disease-producing action on human beings or animals (1) by means of the secretions of its glands, (2) by means of hairs, (3) by poisonous appendages, (4) by sucking the blood, (5) by parasitism, or (6) by transmitting disease germs.

Incidentally, an industrial use for oil from locusts is for airplanes—the oil retaining its fluidity at very high altitude.

A PALATABLE COD LIVER OIL CONCENTRATE.

Harry E. Dubin, in a paper before the Scientific Section, A. Ph. A., Buffalo, reported on a concentrate from cod liver oil, free from oil, practically odorless and tasteless, of which 0.1 Gm., if mixed with 1000 grams of sugar, represents the therapeutic value of 1000 grams of cod liver oil from which it is obtained—almost 700 animal experiments have been carried out to prove the worth of this cod liver oil concentrate; clinical experiments have been made.