widely and deeply into the tissues, causing the collapse of the aerial part of the plant.

The disease caused by these bacteria is very prevalent in and about the District of Columbia. In the fields examined, 80–90 per cent. of the plants were affected but in the majority of these cases not so severely as to noticeably arrest the development and bloom of the plant.

Plants with the same disease have been received from Illinois with the information that it has caused loss to the growers. Some *Gladioli* from California apparently had the same disease but the case was not completely proved.

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THE AMERICAN CHEMICAL SOCIETY

(*Continued*)

SECTION OF SUGAR CHEMISTRY AND TECHNOLOGY

C. A. Browne, *chairman*
Frederick Bates, *secretary*

A rotary digester for use in bagasse analysis: G. L. Spencer. A rotary digester is described for the digestion and extraction of bagasse for purposes of analysis. 100 grams of chopped bagasse are weighed in a tared cylinder: 1 liter of hot water is added. If ammonia is used for preserving the bagasse, no alkali is added to the digestion water, otherwise sodium carbonate is added. The cylinders are closed and revolved in the digester for an hour while steam is turned into the casing. The steam is then shut off, cold water is admitted to the casing and the revolution continued until the sample is cooled. The cylinders are then removed, dried and weighed, the rest of the procedure being the same as in the customary methods of analysis.

Determination of reducing sugars in lead preserved cane juices: J. B. Harris. Samples of raw cane juices for purposes of factory control are composited and preserved with dry lead subacetate. In the determination of reducing sugars, the preserved juice gives results about 10 per cent. too low where sodium oxalate or other normal salts are used to delead. Experiments with various deleading agents show it to be necessary to change reaction of preserved juice to acid in order to recover the reducing sugars combined with the lead. Best results are obtained with oxalic acid as a deleading agent, as it always gives the same results on the preserved juice as are obtained on the same juice without the use of lead or any deleading agent.

Dry substances in molasses, syrups and juices by the Spencer electric oven: George P. Meade. The Spencer electric oven is an apparatus originally devised for rapidly drying granular and fibrous substances, such as sugar, bagasse, etc., by drawing a large amount of heated air through the material to be dried. On suggestion of the inventor, Dr. G. L. Spencer, a method has been worked out for liquid sugar products by absorbing the liquid on asbestos as in the Babcock method for drying milk. With a ten minute heating period, known solutions of sugar, and of invert sugar and salt, are dried quantitatively to one part in 300 or better. Thick solutions, such as molasses and honey, must be diluted with water, one to one by weight. Duplicate tests on many different kinds of molasses, and on honey and cane juice, show close agreement.

Two simple tests for the control of the crystallizer and centrifugal machine work: M. J. Proffitt.

A comparison of the results in the process of desugarization with the Steffen lime process, the barium process and the strontium process: M. Potvliet. The desugarization appears to be in favor of the barium process. The real purity of the juices after deduction for raffinose is highest in the barium process. No raffinose is eliminated either in the Steffen lime process or in the strontium process, whereas in the barium process approximately 50 per cent. of the raffinose is removed into the waste water. The removal of the raffinose is important in view of the discarding of molasses. Of the 48.5 per cent. real sugar in the worked molasses, there was obtained: in the lime process 35.45 per cent. as granulated, 8.05 per cent. in molasses and 5.00 per cent. in waste water; in the barium process 43.97 per cent. as granulated, 2.91 per cent. in molasses and 1.62 per cent. in waste water; in the strontium process 43.18 per cent. as granulated, 4.32 per cent. in molasses and 1.00 per cent. in waste water. The rather heavy waste water of the barium and strontium processes can easily be concentrated to 42° Bé, whereas the very diluted Steffen waste water with large amounts of soluble lime compounds causes many difficulties. Waste water with 42° Bé contains about 12 per cent. K_2O and 4 per cent. N.

The effect of varying hydrogen-ion concentration upon the decolorization of cane juice with carbon: J. F. BREWSTER and W. G. RAINES.

The effect of some decolorizing carbons on the color and colloids of cane juice: J. F. BREWSTER and W. G. RAINES.

The determination of color and decolorization in sugar products: H. H. PETERS and F. P. PHELPS. The degree of color introduced and decolorization obtained for sugar solutions was determined with a spectrophotometer. The difficulties encountered to create filtrates "optically void" out of impure sugar solutions led to the adoption of an analytical procedure. It is shown that the commonly practised mode of analytical preparation for colorimetric analyses leads to erroneous conclusions in regard to color introduced and removed; that consistent results can not be attained as the present criterion for "brilliant filtrates" is far from being synonymous with "filtrates optically void." Inert material employed in the analytical preparation, such as Kieselguhr, must not be used. It leads to selective action on different wave lengths; neither is its most brilliant filter-paper-filtrate "optically void." The final calculation of color in sugar products to a unit basis of "100 Brix, 1 cm." is proposed. The laws governing the application of the spectrophotometer and tint photometer are discussed and directions are given how to express color degrees obtained by other colorimeters on this unit basis. Graphs of transmission and absorption spectra are presented.

A discussion of the refractometer scale for the evaluation of syrups: F. C. ATKINSON. A discussion of the relative merits of both methods for the grading of glucose and other viscous syrups, being an argument for the adoption of the refractometer reading as the official standard for the commercial valuation of such syrups. This argument is based on the higher degree of accuracy, convenience and saving of time over the method now in vogue.

Preparation of mannose from ivory nut shavings: PAUL M. HORTON. In making mannose from ivory nut shavings, the syrup is usually gummy and difficult to crystallize. If, however, the shavings are extracted with sodium hydroxide before being hydrolyzed with sulphuric acid, the final syrup crystallizes from glacial acetic acid without difficulty. If crystallization is slow, it can frequently be hastened by freezing the solution under agitation and thawing slowly. Details as to concentration and temperature are also given.

Flask calibrating and marking device: G. L. SPENCER.

The preparation of a decolorizing char from sugar cane bagasse: C. E. COATES.

A revision of the optical method for analyzing mixtures of raffinose and sucrose: C. A. BROWNE and C. A. GAMBLE. Recent corrections by Steuerwald and by Schrefeld of the Clerget formula for the Herzfeld method of determining sucrose necessitate also a revision of the Creydt formulas for analyzing mixtures of raffinose and sucrose. In making this revision, the authors have redetermined the value of the constant for the invert polarization of raffinose and have also determined the values for the influence of temperature upon the polarizations of raffinose before and after inversion. Applications are given of the Creydt formulas as thus revised to the analysis of mixtures containing known amounts of sucrose and raffinose.

Preliminary note on the causes of caking in sugar: M. J. PROFFITT.

Investigation of conditions affecting the quantitative determination of reducing sugars by Fehling solution. Elimination of certain errors involved in current methods: F. A. QUISUMBING and A. W. THOMAS.

The standardization of rare sugars: H. T. GRABER.

The determination of ash in Cuban raw sugar: UEL S. JAMISON and JAMES R. WITHROW. Difficulty from foamover in ash determination can be eliminated by preliminary heating on electric hot plate before ashing in the usual muffle. A drop or two of vaseline oil also prevents foamover. The sulfate method of ashing used by the Bureau of Standards is found on Cuban raw sugar to give 38 per cent. higher results even with the usual 10 per cent. modification than its direct incineration. The various other ashing methods in the literature have been compared and a modification of the sulfate method suggested.

The quantities and properties of lead precipitates from different raw cane sugars: C. A. BROWNE and H. M. WILEY. A comparison is given of the specific gravities and PbO content of the dried sugar-free lead subacetate precipitates obtained from 3 Cuban centrifugal sugars and 4 Philippine concrete sugars. The lead precipitates from the Cuban sugars had an average sp. gr. of 2.47 and a PbO content of 46.85 per cent., and from the Philippine sugars an average sp. gr. of 2.74 and a PbO content of 49.56 per cent. For a normal

weight of 26 grams of sugar in 100 c.c. the volumes of the lead precipitates in the case of the Cuban sugars of polarization 90.95–96.00 varied from 0.10 to 0.12 c.c. and in case of the Philippine sugar of polarization 78.30–87.80 from 0.32 to 0.48 c.c. The volume of the lead precipitates was not found to increase during deterioration of the sugar.

1. *The saccharimetric graduation of polarimeters with a graduated circle which employ yellow sodium light.* 2. *The graduation of saccharimeters with a quartz compensation:* A. JOBIN. The author employs as a basis for the saccharimetric graduation of his instruments the following fundamental values: + 66.5 for the specific rotation of sucrose for the D ray; + 21.7182 for the rotation of the standard 1 mm. plate of quartz for the D ray. The variations in these fundamental values with concentration of sugar solution, with temperature and with source of light are considered, and a mathematical discussion is given of the various corrections which need to be applied in the saccharimetric graduation of polarimeters and of quartz wedge saccharimeters. Light filters should serve not for unifying, but for purifying the source of illumination. The official rules relating to the bichromate filter should be revised.

Examination of sugar crystals by projection: GEORGE P. MEADE. Samples of raw sugar from several factories are classified daily as to size and regularity of crystal. A "balopticon," with vertical attachment, throws an image of a small portion of the sample on a screen, magnifying ten diameters. Squares drawn on the screen correspond in size to an arbitrary scale of ten, and the observer compares the image of the crystals with the squares, determining the size to the nearest whole number of the scale. The projection also shows the regularity and form of the crystals, and abnormalities are noted.

The rare sugars, their purity and tests: R. B. BLACK.

A study of beet gum. (1) *Separation from final molasses:* H. S. PAINE and C. F. WALTON.

Solubility of dextrose in water: R. F. JACKSON and C. L. GILLIS.

Some observations from the beet sugar industry: H. E. ZITKOWSKI.

Sugar filtration in factories and refineries: H. J. RUNYON, JR.

Colloids in beet sugar house liquors and products: H. S. PAINE, C. G. CHURCH and F. W. REYNOLDS.

Experiments with sugar cane seedlings in St. Croix: LONGFIELD SMITH. Experiments conducted during 1920 upon the St. Croix seedling canes—S. C. 12/37, S. C. 12/4, S. C. 14/93, and S. C. 13/13—gave in comparison with the standard ribbon cane grown for comparison alongside the following yields of cane and of sucrose per acre, as obtained by a small 3 roller mill driven by a 5 h.p. gasoline engine.

	Tons Cane per Acre	Pounds Sucrose per Acre
S. C. 12/37	35.7	7460
Ribbon alongside	27.3	5157
S. C. 12/4	31.5	6970
Ribbon alongside	28.4	5771
S. C. 14/93	36.9	6671
Ribbon alongside	31.5	5306
S. C. 13/13	38.3	6455
Ribbon alongside	32.1	6248

With a stronger mill such as used in a modern sugar factory the above yields of sucrose per acre would be at least 50 per cent. higher. The new St. Croix seedlings are excellently adapted to local conditions and are rapidly finding favor not only in St. Croix but in Porto Rico and other West Indian islands. The S. C. 12/4, when ripe, yields a juice containing 20 per cent. sucrose. The juice of ripe ratoons has been known to yield 24 per cent. of sucrose.

A precipitate obtained from cane juice after clarification with Kieselguhr and decolorizing carbon: V. BIRCKNER.

Experiments with Schoorl's volumetric method for determining reducing sugars: C. A. BROWNE and G. H. HARDEN. In Schoorl's volumetric method for determining reducing sugars, the unreduced copper of the Fehling solution is determined in presence of the reduced Cu_2O by means of $n/10$ thiosulphate solution after acidifying with sulphuric acid and adding potassium iodide. The difference between the total copper originally present and the unreduced copper gives the copper reduced by the sugar. Applications of this method to the analysis of solutions of dextrose, maltose, lactose and sucrose are given, with comparisons of the results obtained by direct weighing of the reduced copper.

The continuous sampling of sugar liquors: W. L. JORDAN.

Preparation of galactose: E. P. CLARK.

The manufacturing of high purity crystalline anhydrous dextrose: C. E. G. POYST.

CHARLES L. PARSONS,
Secretary