

REVIEW.

PROCEEDINGS OF THE THIRD SESSION OF THE INTERNATIONAL
COMMISSION FOR UNIFORM METHODS OF SUGAR
ANALYSIS, HELD IN PARIS, JULY 24, 1900.

Participants of the convention were :

Prof. Dr. A. Herzfeld, chairman.

Prof. Dr. Brodhun, delegate of the Imperial Physical-Technical Institute, Berlin.

Regierungsrat Dr. von Buchka, delegate of the Imperial Institute of Hygiene, Berlin.

Mr. Camuset, chairman of the Technical Commission of the Syndicate of French Sugar Manufacturers.

Dr. Hermann, of the laboratory of Dr. Alberti and Hempel, Hamburg.

Mr. François Herles, trade-chemist, Prague.

Mr. A. Jobin, Paris.

Mr. François Sachs, Brussels.

Mr. Saillard, chemist of the Chambre Syndicale des Fabricants de Sucre, France.

Regierungsrat F. Strohmer, delegate of the Association for the Beet-Sugar Industry in Austria-Hungary.

Mr. van Voss, chairman of the Association of Dutch Sugar-Manufacturers.

Dr. Otto Wendel, of the laboratory of Dr. Hugo Schulz, Magdeburg.

Dr. F. G. Wiechmann, delegate of the American Sugar Refining Company, New York.

Dr. H. W. Wiley, chief chemist, Department of Agriculture, Washington, D. C.

Dr. Heinrich Winter, Java.

The chairman opened the session on July 24, 1900, in the large hall of the Chambre Syndicale des Fabricants de Sucre de France, welcomed those present and expressed special thanks to the Chambre Syndicale des Fabricants de Sucre de France for the hospitable reception as well as for having delegated Mons. Camuset to the meeting of the commission.

Messrs. Bunge, Kiew, Van Ekenstein, Amsterdam, Nevolé, Prague, and Dupont, Paris, requested that their absence be excused.

After the chairman had given a short résumé of the origin, as well as of the prior work of the commission, he requested Messrs. Saillard and Wiechmann to again undertake the editing of the French and the English text of the Proceedings, which both gentlemen willingly agreed to do.

Referring to the prior written communication, the chairman then once more put before the commission the question: Which normal weight should be valid for the German instruments, when using the metric flask? As is well known, the Imperial Physical-Technical Institute has called attention, by its communication dated October 19, 1898, to the fact, that an exact conversion of the normal weight 26.048 grams for Mohr's cubic centimeters at 17.5° C., corresponds to 26.01 grams (not 26.00), metric volume, at 20° C., determined in air, with brass weights.

"The Commission decides that, in consideration of the insignificance of the deviation, the normal weight of 26.00 grams shall henceforth be adopted for 100 metric cubic centimeters, at 20° C., determined in air with brass weights."

Mr. Wiley then spoke of the results of his researches concerning the influence of temperature on the polarization of sugar; his remarks are given in the *Vereins-zeitschrift*.

This was followed by a communication by Mr. Wiechmann, of New York, concerning the influence of temperature on the specific rotation of sugar, an abstract of his publication appearing in the *Zeitschrift des Vereins der Deutschen Zucker-industrie*.

A long discussion bearing on the substance of the two lectures followed, in which Professor Dr. Brodhun removed some wrong conceptions which some of those present had entertained, concerning the experimental basis of the lectures, and especially concerning the researches which the Imperial Physical-Technical Institute at Berlin had made on the same subject.

Mr. Pellat was unable to be present on the day of the session; the commission therefore agreed to be present at his lecture, Friday, July 27, 1900, in the session of Section V, of the Congress for Applied Chemistry, as Mr. Pellat intended to give his lecture on the day and at the place named.

Mr. Jobin reported that he himself had not made personal investigations regarding the influence of temperature on polariscopic instruments; he referred solely to his earlier publication on this subject, as well as to the coming lecture of Mr. Pellat. Mr. Jobin discussed the errors with which instruments provided with quartz-wedge compensations are burdened; this gave rise to a longer discussion.

Then Professor Dr. Herzfeld made a brief report on the results of the examination of quartz plates, concerning which a full report will be found in the *Vereins-zeitschrift*. The commission agrees that these quartz plates shall be divided among the nations represented; for the United States, the quartz plates are to be sent to the Department of Agriculture, at Washington; for France, to the syndicate of the sugar manufacturers; for Belgium, Holland, Austria-Hungary, and Russia, to the associations of

sugar manufacturers which are represented in the session by delegates.

The session was then adjourned for lunch, and reopened at 2 o'clock in the afternoon of the same day.

AFTERNOON SESSION.

Herr Regierungsrat Strohmer delivered his lecture on a uniform method of sugar analysis for international trade, and submitted, as a basis for the same, the agreement which the Austro-Hungarian chemists had last reached in their convention, June 22, 1896, at Budapest. Mr. Strohmer proposed to accept these resolutions, with certain deviations, as a basis of the international agreement, and suggested for this purpose the separate discussion of the different topics. The convention agreed to do this, but first of all considered it necessary to establish general principles for the adjustment of polariscopic instruments, as well as for the avoidance of errors caused by the influence of temperature.

On motion of Messrs. Camuset and Saillard, first of all, the following was adopted:

“The convention declares it to be necessary that the rotation of chemically pure sugar be accepted as the fundamental basis in saccharimetry.”

The chemically pure sugar which is to be employed for this purpose shall everywhere be prepared according to the same method, which is as follows (method of the English chemists):

Purest commercial sugar is to be further purified in the following manner: A hot saturated aqueous solution is prepared and the sugar precipitated with absolute ethyl alcohol; the sugar is carefully spun in a small, centrifugal machine and washed in the latter with some alcohol. The sugar thus obtained is redissolved in water, again the saturated solution is precipitated with alcohol and spun and washed as above. The product of the second centrifuging is dried between blotting-paper and preserved in glass vessels for use. The moisture still contained in the sugar is determined and taken into account when weighing the sugar which is to be used.

The convention furthermore decided that central stations shall be designated in each country which are to be charged with the preparation and the distribution of chemically pure sugar. Wherever this arrangement is not feasible, quartz plates, the values of which have been determined by means of chemically pure sugar, shall serve for the control of the saccharimeters.

Mention should be made of the fact that in the discussion on this topic, it was remarked, on the one hand, that the preparation of chemically pure sugar is not an easy task, and that in countries

having hot climates, sugar is dried with difficulty and hence is not stable, and hardly available for transportation. Thereupon it was pointed out that the above control, by means of chemically pure sugar, should, as a rule, apply only to the central stations which are to test the correctness of saccharimeters; for those who execute commercial analyses, the repeated control of the instruments is to be accomplished, now as before, by means of quartz plates.

Concerning the working temperature the following resolution of Mr. François Sachs was unanimously adopted:

“In general, all sugar tests shall be made at 20° C.

“The adjustment of the saccharimeter shall be made at 20° C.; one dissolves for instruments arranged for the German normal weight, 26 grams of pure sugar in a 100 metric cubic centimeters flask,¹ weighing to be made in air, with brass weights, and polarizes the solution in a room, the temperature of which is also 20° C.; under these conditions, the instrument must indicate exactly 100.00.

“The temperature of all sugar solutions to be tested is always to be kept at 20° C., while they are being prepared, and while they are being polarized.

“However, for those countries, the temperature of which is generally higher, it is permissible that the saccharimeters be adjusted at 30° C. (or at any other suitable temperature) under the conditions specified above and providing that the analyses of sugar be made at that same temperature.”

Objections were raised against the universal normal weight, 20.00 grams, by Mr. François Sachs as well as by Mr. Strohmer. In consequence, it was resolved not to undertake the introduction of the same, but to adopt the resolution:

The general international introduction of a uniform normal weight is desirable.

It was furthermore resolved, on the basis of the proposition of Mr. Strohmer, to observe the following rules in raw sugar analysis.

I. POLARIZATION.

“In effecting the polarization of substances containing sugar, half-shade instruments only are to be employed.

“During the observation, the apparatus must be in a fixed, unchangeable position, and so far removed from the source of light that the polarizing Nicol is not warmed by the same.

“As source of light there are to be recommended, lamps with intense flame (gas triple burner, with metallic cylinder, lens, and reflector; gas lamp, with Auer burner; electric lamp; petroleum duplex lamp; sodium light).

¹ Or during the period of transition 26.048 grams in 100 Mohr's cubic centimeters.

“The chemist must satisfy himself, before and after the observation, of the correctness of the apparatus (by means of correct quartz plates), and in regard to the constancy of the light; he must also satisfy himself as to the correctness of the weights, of the polarization flasks, the observation tubes, and the cover glasses. (Scratched cover glasses must not be used.)

“Several readings are to be made and the mean thereof taken, but any one individual reading must not be selected.

POLARIZATION OF RAW SUGAR.

“To make a polarization, the whole normal weight for 100 cubic centimeters is to be used, or a multiple thereof for any corresponding volume.

“As clarifying and decolorizing reagents there may be used: sub-acetate of lead, prepared according to the ‘Pharm. Germ.’ (three parts by weight of acetate of lead, one part by weight of oxide of lead, ten parts by weight of water), Scheibler’s alumina cream, concentrated solution of alum. Boneblack and decolorizing powders are to be absolutely excluded.

“After bringing the solution exactly to the mark, and after wiping out the neck of the flask with filter-paper, all of the well shaken, clarified sugar solution is poured upon a dry, rapidly filtering filter. The first portions of the filtrate are to be thrown away, and the balance, which must be perfectly clear, is to be used for polarization.

WATER.

“In normal beet-sugars the water determination is to be made at 105° to 110° C.

“For abnormal beet-sugars, as well as for colonial sugars, there is no commercial method for the determination of water.

ASH.

“To determine the ash-content in raw sugars, the determination is to be made according to Scheibler’s method employing pure concentrated sulphuric acid. For an ash determination, at least 3 grams of the sample are to be used. The incineration is to be carried out in platinum dishes, by means of platinum or clay muffles, at the lowest possible temperature (not above 750° C.).

“From the weight of the sulphate-ash thus obtained, 10 per cent. are to be deducted, and the ash-content, thus corrected, is to be recorded in the certificate.

ALKALINITY.

“As, according to the most recent investigations, the alkalinity of raw sugars is not always a criterion of their durability, the

commission abstains from proposing definite directions for the execution of these investigations.

INVERT SUGAR.

“The quantitative determination of invert sugar in raw sugars is to be made according to the method of Dr. A. Herzfeld (*Zeitschrift des Vereins für die Rübenzuckerindustrie des Deutschen Reiches*, 1886, pp. 6 and 7).”

Furthermore the following resolutions were adopted :

“The commission declares that only well-closed glass vessels will insure the stability of samples.

“To obtain correct results it is desirable that the samples contain at least 200 grams of material.”

All of the above resolutions were adopted *unanimously* by those present.

The chairman then declared that he considered the work of the commission completed, and he requested the convention to authorize him to prepare and to accept the protocol, and thereupon to declare the commission dissolved.

Mr. Wiley, however, stated that he considered it necessary that the commission be made a permanent one. He proposed that Mr. Herzfeld be again elected chairman. This resolution was unanimously carried.

After Mr. Wiechmann had expressed the thanks of those assembled, to the chairman, the session was closed.

FRIDAY, JULY 27, 1900.

The members of the commission, in accordance with the resolutions adopted on Tuesday forenoon, attended the session of Section V, of the International Congress for Applied Chemistry, and there heard the lecture of Mr. Pellat on the “Influence of Temperature on the Specific Rotation of Sugar.”

F. G. WIECHMANN, *Secretary*.

NOTE.

Estimation of Fat in Sweetened Condensed Milk.—In the Journal for October, 1900, appears an article by J. F. Geisler, on “The Estimation of Fat in Sweetened Condensed Milk,” in which reference is made to “A Method of Analysis for Canned Condensed Milk”¹ wherein the results are stated to be “so utterly out of harmony with the composition of commercial condensed milk, etc.,” that I feel it only proper to call attention to the eight determinations obtained by my critic in extracting the

¹ This Journal 21, 439 (1899).