INVESTIGATION OF THE SCIENTIFIC AND ECONOMIC RELATIONS OF THE SORGHUM SUGAR INDUSTRY, BEING A REPORT MADE IN RESPONSE TO A REQUEST FROM THE HON. GEORGE B. LORING, NOVEMBER, 1882

Published @ 2017 Trieste Publishing Pty Ltd

#### ISBN 9780649468720

Investigation of the Scientific and Economic Relations of the Sorghum Sugar Industry, Being a Report Made in Response to a Request from the Hon. George B. Loring, November, 1882 by Committee of the National Academy of Sciences

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd. Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

www.triestepublishing.com

## COMMITTEE OF THE NATIONAL ACADEMY OF SCIENCES

INVESTIGATION OF THE SCIENTIFIC AND ECONOMIC RELATIONS OF THE SORGHUM SUGAR INDUSTRY, BEING A REPORT MADE IN RESPONSE TO A REQUEST FROM THE HON. GEORGE B. LORING, NOVEMBER, 1882



# NATIONAL ACADEMY OF SCIENCES.

# INVESTIGATION

OF THE

# SCIENTIFIC AND ECONOMIC RELATIONS OF THE SORGHUM SUGAR INDUSTRY,

BEING A REPORT

MADE IN RESPONSE TO A REQUEST PROM

THE HON. GEORGE B. LORING,

U. S. Commissioner of Agriculture,

BY A COMMITTEE OF THE NATIONAL ACADEMY OF SCIENCES.

NOVEMBER, 1882.

WASHINGTON: GOVERNMENT PRINTING OFFICE. 1883.

#### LETTERS OF TRANSMITTAL.

DEPARTMENT OF AGRICULTURE, Washington, D. C., January 10, 1883.

SIR: In compliance with a resolution of the Senate, July 1, 1882, I transmit herewith for the use of the Senate a copy of the report of the committee of the National Academy of Sciences upon the subject of Sorghum Sugar. I deem it proper to state in this connection that I have been unable to comply with the direction of the Senate at an earlier date on account of delay in transmitting the report of the Academy to this Department, which was not received until November 15, 1882; and a communication from the Acting President of the Academy, dated December 23, 1882, which forms a part of the report. The preparations of the voluminous manuscript copy of the report has moreover required a considerable length of time, and the illustrations required by the Academy for the report are just now received, having been supplied to this Department on the 8th instant.

Very respectfully, your obedient servant,

GEO. B. LORING,

Commissioner of Agriculture.

Hon. DAVID DAVIS.

President of the Senate of the United States.

YALE COLLEGE, NEW HAVEN, CONN., ... November 13, 1882.

SIR: I have the honor to transmit to you herewith a report on the sorghum-sugar industry, made by a Committee of the National Academy of Sciences, in accordance with the request contained in your communication of January 30, 1882.

Very respectfully,

O. C. MARSH,

Acting President of the National Academy of Sciences.

Hon. GEORGE B. LORING,

United States Commissioner of Agriculture.

NEW HAVEN, CONN., November 1, 1882.

SIR: Herewith I have the honor to hand to you the report of a committee appointed by the late President Rogers, at the request of the Hon. George B. Loring, United States Commissioner of Agriculture, of date January 30, 1882, for the "scientific investigation of the sorghum question."

The scientific relations of this question are so intimately interwoven with the economic that the two cannot well be considered separately. The Committee were, therefore, glad to learn from a subsequent communication, dated March 24, 1882, from the honorable Commissioner, that "he regarded the investigation of the economic value of sorghum to the sugar manufacturer the point especially interesting to his Department."

Both sides of the sorghum question are, therefore, considered in the report.

Respectfully, yours,

B. SILLIMAN, Chairman, &c.

Prof. O. C. MARSH,

Acting President of the National Academy of Sciences.

# CONTENTS.

PARTI.	
REPORT OF THE COMMITTEE.	
122 3230 50 W	Page.
The Committee	9
The Sorghum Sugar Industry: Introduction	13
Conflicting opinions on essential points	14
1. Of the kind of sugar present in the juice	14
2. Best varieties of sorghum for the production of sugar	15
present	15
4. Prompt working of sorghum after cutting	18
5. The necessity of further investigation	19
Work of Dr. Collier, chemist to the Department of Agriculture	19
The agricultural characters of sorghum	20
Value of the research in a material sense to the nation	23
Further investigations desirable	24
The analytical methods employed	25
Comparative results of analysis and polarization	26
Summary	27
Production of sugar from sorghum; failure and success	29
Failures:	
1. Failure of the efforts of the Department of Agriculture to produce sugar	
in 1881	29
2. Partial failure at Faribault, Minn	30
Buccesses:	
1. The State of New Jersey agricultural experiment station, 1881	31
2. The Rio Grande Sugar Company, New Jersey	31
Additional statements respecting the Rio Grande plantation: Note	33
3, The Illinois Industrial University in 1881	34
Same, 1882	34
<ol> <li>Experimental farm of the University of Wisconsin, Professor Swenson.</li> </ol>	34
<ol><li>Capt. R. Blakeley: Faribault Refinery, Minnesota: Fuller statement</li></ol>	35
6. Crystal Lake Refinery: J. B. Thoms	36
7. Mr. A. J. Russell, Janesville, Wis	36
8. G. W. Chapman, secretary, Kansas	37
9. Mr. Bassett: France cited	37
10. Professor Johnson of the Committee	37
11. Clinton Bozarth, Iows	38
12. Proceedings Mississippi Valley Cane Growers' Association	38
13. Sugar canes, &c.: Isaac A. Hedges	38
14. Joseph S. Lovering (1857)	38
15. Henry Talcott, Ohlo	38
16. B. V. Ramson, Salem, Nebr	39
17. C. Conrad Johnson, Baltimore	39

#### CONTENTS.

### PART II.

	CONCLUSION.	Page	
Su	MMARY OF RESULTS OBTAINED	Page 4	
-	A.—OF THE POINTS ALREADY SETTLED		
	1. The presence of sugar in the juices of sorghum and maize stalks	4	
	Average results of analyses of juices, thirty-five varieties of sor-		
	ghom.	4	
	2. Practically little difference in the varieties, etc	4	
	3. When the maximum content of sugar is present in sorghum	4	
	4. Conflicting testimony before the investigation	4	
	5. Importance of an even crop	4	
	6. Importance of promptly working the crop after it has been cut up.	4	
	7. Sugar has been made from sorghum	4	
	8. The hydrometer and ripe seed sufficient test, etc	1 15	
	9. Length of period for working sorghum	4	
	10. Effect of rain on composition of sorghum juices	5	
	II. Effect of frost upon sorghum	6	
	12. Manufacture of sugar from sorghum		
	13. Effect of fertilizers upon the production of sugar in sorghum	5	
	14. The so-called gum a product of manufacture	5	
	B.—Future investigations	5	
	Work remaining to be done	5	
	Names of the Committee	5	
	PART III,		
	APPENDED PAPERS.	0	
1.	Of the so-called Chinese sugar-cane: Notes from Dr. S. Wells Williams	5	
	Dr. E. Bretschneider	5	
2,	M. Louis Vilmorin: Essay on sorgham. ("Le Bon Jardinier, 1855")	5	
	Letter from Leonard Wray: Persk, 1882	6	
4,	Facts regarding sorghum and some conclusions as to its value as a source		
	of sugar: By Peter Collier, Ph. Dr. (Paper presented at the Philadel-		
	phia meeting of the National Academy of Sciences, November, 1881)	6	
5,	Report upon statistics of sorghum. Addressed to Hon. George B. Loring,		
	by J. R. Dodge, statistician	6	
6,	"New Jersey Agricultural Experiment Station XVIII: Sorghum sugar cane"	7	
7.	Rio Grande Sugar Company, New Jersey	7	
	A.—Letter from G. C. Potts, president, to the Tariff Commission	7	
	B.—Captain Blakeley, describing his visit to the Rio Grande Sugar		
	Works	7	
	C Mr. Harry McCall, of Louisiana, describing his visit to the Rio	1	
	Grande Sugar Works	7	
	D.—Blank form for returns to secure the bounty from the State of New Jorsey	7	
8.	Champaigu Sugar and Glucose Company: Report (in part) for 1882	7	
9.	Experiments in Amber cane, &c., at the experimental farm, Madison, Wis.: Prof. W. A. Henry and Magnus Swenson for 1881.	7	
10	Illinois Industrial University: Report on the manufacture of sugar, sirup,	1 18	
20,	and glucose from sorghum, &c., by Henry A. Weber, Ph. D., and Mel-		
	vill A. Scovell, M. S., for 1881	10	
11	H. A. Weber, Ph. D.: Letter of date March 18, 1882, to B. Silliman	11	
	A. J. Russell, Janesville, Wis.: Two letters of date December 28, 1881, to		
4.00	the Commissioner, and March 22, 1882, to the chairman	11	

#### CONTENTS.

		Page.
13.	John B. Thoms, Crystal Lake Refinery, Chicago, Ill.: Two letters to B.	
14.	Silliman, of date April 10, 1882  Geo. W. Chapman, secretary Price County, Kansas, Farmers' Club, Sterling, Price County: Letter of date February 6, 1882, to the Commissioner of	119
	Agriculture	122
15.	Joel M. Clark, Italy Hollow, N. Y.: Letter of date March 8, 1882, to the Commissioner	122
16.	Joseph Wharton, Cansden, N.J.: Letter to B. Sillimau, of date April 8, 1882.  Records negative results of his beet-root culture, but expresses confidence in the future of sorghum in South New Jersey.	122
17	J. F. Porter, Red Wing, Minn.: Letter to Dr. Collier, of date March 5, 1882.	123
	Blymyer Manufacturing Company, Cincinnati, Ohio: Letter of date March	9
10	15, 1882, to B. Silliman	123 124
	Letter of Joseph Albrecht, chemist, on the results obtained at the United	124
<i>~</i> 0.	States Department of Agriculture	124
21.	Letter from B. V. Ransom, Nebraska, of date October 22, 1882: Balance-	2 - STAN
no	sheet	125
	The same for 1881	126 127
	Letter from Ephraim Link, author of Link's Hybrid Letter of Issac A. Hedges, Saint Louis, with sorghum samples	127
	List of samples exhibited April, 1882, at the Academy meeting, by the Chair-	***
(1282)	man and deposited in the National Museum	128
	Letter to B. Silliman, Chairman, &c., from Isaac A. Hedges, of April, 1882. Letter from C. Conrad Johnson, of Baltimore, Md., of date March 30, 1882.	128
	to B. Silliman	131
28.	Letter from Henry B. Richards, of Texas, on orange cane	140
	Letter from General Ashbel Smith, of Houston, Tex., to B. Silliman	141
30.	Duplicate analyses of sorghum juices, by Dr. Collier	142
31.	The Connecticut Agricultural Experiment Station: Analysis of sorghum	Saleni
	seed, by Prof. S. W. Johnson	144
32.	United States Department of Agriculture: Hon, Commissioner Loring's cir-	
	cular of date June 6, 1882, to manufacturers of sugar from sorghum, &c	144
	Report of Professor Swenson, October, 1882	146
34.	Bibliography of sorghum	148

30**.**53 **9** ⊕) © 25 39% 9 8 To est