

**TENTH ANNUAL REPORT OF  
THE VERMONT  
AGRICULTURAL EXPERIMENT  
STATION, 1896-97**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649058310

Tenth Annual Report of the Vermont Agricultural Experiment Station, 1896-97 by Vermont  
Agricultural Experiment Station

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](http://www.triestepublishing.com)

**VERMONT AGRICULTURAL EXPERIMENT STATION**

**TENTH ANNUAL REPORT OF  
THE VERMONT  
AGRICULTURAL EXPERIMENT  
STATION, 1896-97**



UNIVERSITY OF VERMONT  
AND STATE AGRICULTURAL COLLEGE.

---

TENTH

ANNUAL REPORT

— OF THE —

VERMONT AGRICULTURAL  
EXPERIMENT STATION

1896--97.



MONTPELIER, VT. :  
VERMONT WATCHMAN COMPANY,  
1897.

THE VERMONT  
Agricultural Experiment Station.

BURLINGTON, VT.

---

PRES. M. H. BUCKHAM, *Ex-officio, Chairman.*

HON. E. J. ORMSBEE, Brandon.

HON. CROSBY MILLER, Pomfret.

HON. CASSIUS PECK, Burlington.

HON. G. S. FASSETT, Enosburgh.

---

OFFICERS OF THE STATION.

J. L. HILLS,	- - - -	Director and Chemist.
G. H. PERKINS	- - - -	- Entomologist.
L. R. JONES,	- - - -	- Botanist.
F. A. WAUGH,	- - - -	- Horticulturist.
F. A. RICH,	- - - -	- Veterinarian.
*CASSIUS PECK,	- - - -	- Farm Superintendent.
B. O. WHITE,	- - - -	- Assistant Chemist.
C. H. JONES,	- - - -	- Assistant Chemist.
†D. D. HOWE	- - - -	- Farm Superintendent.
J. C. ROBINSON,	- - - -	- Dairyman.
MARY A. BENSON,	- - - -	- Stenographer.
E. H. POWELL,	- - - -	- Treasurer.

---

\*From Feb. 1, 1897.

†To Feb. 1, 1897.



~~V. 3686~~  
Sci 1644.5  
The Station.

## ANNOUNCEMENT.

The Vermont State Agricultural Experiment Station was established in accordance with an act of the General Assembly, approved November 24, 1886, for the purpose of promoting agriculture by scientific investigation and experiment. The station was established in connection with the University of Vermont and State Agricultural College, and for the past eight years has received the funds appropriated by Congress under the provisions of the Act commonly known as the "Hatch Act," approved March 2, 1887. The State appropriation expired in 1890.

The station is prepared to analyze and test fertilizers, cattle foods, seeds, milk, and other agricultural materials and products, to identify grasses, weeds, blights, etc., and insects, and to give information on various subjects of agricultural science for the use and advantage of the citizens of Vermont.

All chemical analyses, etc., proper to an experiment station, that can be used for the public benefit, will be made without charge, so far as time and means permit. The Station will undertake no work the results of which are not at its disposal to use or publish if deemed advisable for the public good. The results of each analysis will be promptly communicated to the party sending the sample. Those that are of general interest will be published in the annual report or in bulletins for free distribution. The work of the year will be summed up in the annual report of the station.

It is the wish of the Board of Control to make the station as widely useful as its resources will admit. Every Vermont citizen who is concerned in agriculture, whether farmer, manufacturer or dealer, has the right to apply to the station for any assistance that comes within its province to render, and the station will respond so far as it lies in its power. All communications relating to agriculture, horticulture, plant or animal diseases, insects, etc., will be fairly considered, and, so far as possible, promptly answered.

The station farm and buildings are on the Williston road, adjoining the university grounds on the east. Electric cars pass within a quarter of a mile of the station building, at Colchester avenue and University place. Both the station and the farm have telephone connections and may be spoken from most telephone offices in the State.

☞ Instructions for taking samples of fertilizers, fodders, milk, water, etc., will be sent on application. Parties desiring to send samples should first write for these directions. Many samples received are useless, being incorrectly drawn. Parcels by express, to receive attention, should be prepaid.

☞ Copies of the reports and bulletins of the station are sent free of charge to any address upon application.

☞ Address all communications, not to individual officers, but to the  
EXPERIMENT STATION, BURLINGTON, Vt.

## TABLE OF CONTENTS.

	PAGE.
Officers of the Station.....	2
Announcement.....	3
Table of Contents.....	4
Financial Reports for 1895-96 and 1896-97.....	6-7
Report of the Director.....	8-15
Publications on hand.....	15
Abstracts of Bulletins.....	17-27
Nos. 50, 51 and 52. Analyses of Commercial Fertilizers (1895), by J. L. Hills, B. O. White and C. H. Jones.....	17
No. 53. The Pollination of Plums, by F. A. Waugh.....	19
No. 54. Salad Plants and Plant Salads, by F. A. Waugh....	20
No. 55. Apple Growing in Grand Isle County, by F. A. Waugh	21
No. 56. Orange Hawkweed, or "Paint-Brush," by L. R. Jones and W. A. Orton.....	21
Nos. 57, 58 and 59. Analyses of Commercial Fertilizers, by J. L. Hills, B. O. White and C. H. Jones.....	22
Report of the Chemists, by J. L. Hills, B. O. White and C. H. Jones..	23-33
Analyses of Miscellaneous Fertilizers.....	28
Analyses of Drinking Water.....	31
Miscellaneous Analyses.....	32
Pig Feeding, by J. L. Hills.....	34-43
History of Tests.....	34
Daily Rations, Gains, etc.....	36
Corn Meal and Shelled Corn.....	39
Skim Milk and Whey.....	40
Large and Small Quantities of Skim Milk.....	40
Proper Time to Market Pork.....	41
Financial Summary.....	42
Value of Skim Milk and Whey.....	42
Fertilizing Value of Feeds.....	42
Report of the Botanist, by L. R. Jones.....	44-74
I. Potato Diseases and Remedies.....	45
1. Potato Diseases as they occurred in 1896.....	45
2. Studies upon Fungi associated with Early Blight.....	45
3. Tests of Various Forms of Bordeaux Mixture.....	52
4. The Effects of Disinfectants upon the Growth of Seed Potatoes.....	53
II. Apple Scald.....	55
III. Observations upon Oat Smut.....	59
IV. The Onion Mildew.....	61
1. Laboratory Studies upon the Fungus.....	61
2. Field Experiments with Fungicides.....	61
V. The Orange Hawkweed or "Paint-Brush".....	62



Report of the Entomologist, by G. H. Perkins.....	75-86
The Red Spider.....	75
Life History.....	76
Remedies.....	82
Report of the Horticulturist, by F. A. Waugh.....	87-133
I. Problems in Plum Pollination.....	87
1. Self-Sterility, the Necessity of Cross-Pollination.....	87
2. Natural Adaptations for Cross-Pollination.....	89
3. Pollination Affinities of Varieties and Species.....	91
4. Blossoming Seasons of Plums.....	92
II. Classification of Plums.....	98
III. Preliminary Report on the Artificial Use of Enzymes in Germination.....	106
IV. The Preservation of Fruits by Vapor of Alcohol.....	111
V. A Report on the Occurrence of the Cabbage-Root Maggot.....	116
VI. The Italian or "Orchid-Flowering" Cannas.....	119
VII. A New Grafting Machine.....	122
Appendix to Report of Horticulturist.....	124
Dairying, by J. L. Hills.....	134-220
I. Studies in Methods of Experimental Feeding Trials.....	135
1. Summary.....	135
2. Introduction.....	137
3. Statement of Methods and Details of Conduct of Tests.....	139
4. The Proper Length of Feeding Periods.....	146
(a) Effect of Varying Period Lengths upon Quantity of Product.....	149
(b) Effect of Varying Period Lengths upon Quality of Product.....	150
5. The Relative Feeding Value of Two Rations of Equal Balance.....	161
6. Experimental Error in Feeding Tests.....	165
7. Practical Conclusions of Economic Value.....	167
II. Feeding Trials with Silages and Potatoes.....	169
1. Summary.....	170
2. Corn Silage vs. Silage made from Cowpeas and Soja Beans.....	171
3. Corn Silage vs. Potatoes.....	173
III. The Effect of Food upon the Quality of Butter.....	175
1. Summary.....	175
2. Effect upon Butter.....	176
3. Effect upon Churning.....	179
IV. Record of the Station Herd for 1895-96.....	181
V. Miscellaneous Fodder Crops.....	188
VI. Tests of Dairy Apparatus.....	191
VII. Appendix, containing condensed data pertaining to Articles I and II.....	193
Index.....	221

# FINANCIAL REPORT

For the Fiscal Year Ending June 30, 1896.

## Vermont Agricultural Experiment Station

IN ACCOUNT WITH

**The United States Appropriation, 1895-6.**

DR.

To Receipts from the Treasurer of the United States as per appropriation for fiscal year ending June 30, 1896 as per Act of Congress, approved March 2, 1887.....\$15,000 00

CR.

*Abstract.*

By Salaries.....	1.....	\$4,130 02
" Labor.....	2.....	5,547 20
" Publications.....	3.....	1,450 49
" Postage, stationery and telegrams.....	4.....	469 29
" Freight and express.....	5.....	229 08
" Heat, light and water.....	6.....	627 30
" Chemical supplies.....	7.....	267 92
" Seeds, plants and sundry supplies.....	8.....	71 18
" Fertilizers.....	9.....	69 50
" Feeding stuffs.....	10.....	122 26
" Library.....	11.....	176 67
" Tools, implements and machinery.....	12.....	173 03
" Furniture and fixtures.....	13.....	24 67
" Scientific apparatus.....	14.....	126 96
" Live stock.....	15.....	696 50
" Traveling expenses.....	16.....	180 59
" Contingent expenses.....	17.....	37 83
" Building and repairs.....	18.....	599 51
Total,		\$15,000 00

We, the undersigned, duly appointed Auditors of the Corporation, do hereby certify that we have examined the books and accounts of the Vermont Agricultural Experiment Station for the fiscal year ending June 30, 1896; that we have found the same well kept and classified as above, and that the receipts for the year from the Treasurer of the United States are shown to have been \$15,000, and the corresponding disbursements \$15,000, for all of which proper vouchers are on file and have been by us examined and found correct.

And we further certify that the expenditures have been solely for the purposes set forth in the Act of Congress approved March 2, 1887.

Signed,

MATTHEW H. BUCKHAM, CASSIUS PECK, GARDNER S. FASSETT,	}	Auditors.
---	---	-----------



ATTEST,

E. HENRY POWELL,	}	Custodian.
------------------	---	------------

# FINANCIAL REPORT

For the Fiscal Year Ending June 30, 1897.

## Vermont Agricultural Experiment Station,

IN ACCOUNT WITH

**The United States Appropriation, 1896-7.**

DR.

To Receipts from the Treasurer of the United States as per appropriation for fiscal year ending June 30, 1897, as per Act of Congress, approved March 2, 1887.....\$15,000 00

CR.

*Abstract.*

By Salaries .....	1		\$ 4007.83
" Labor .....	2		5090.06
" Publications .....	3		1556.45
" Postage, stationery and telegrams .....	4		254.53
" Freight and express .....	5		106.69
" Heat, light and water .....	6		908.83
" Chemical supplies .....	7		340.38
" Seeds, plants and sundry supplies .....	8		387.67
" Fertilizers .....	9		276.76
" Feeding stuffs .....	10		414.51
" Library .....	11		72.73
" Tools, implements and machinery .....	12		134.20
" Furniture and fixtures .....	13		40.95
" Scientific apparatus .....	14		142.64
" Live stock .....	15		175.00
" Traveling expenses .....	16		305.02
" Contingent expenses .....	17		105.87
" Building and repairs .....	18		679.28
Total,			\$15,000 00

We, the undersigned, duly appointed Auditors of the Corporation, do hereby certify that we have examined the books and accounts of the Vermont Agricultural Experiment Station for the fiscal year ending June 30, 1897; that we have found the same well kept and classified as above, and that the receipts for the year from the Treasurer of the United States are shown to have been \$15,000, and the corresponding disbursements \$15,000, for all of which proper vouchers are on file and have been by us examined and found correct.

And we further certify that the expenditures have been solely for the purposes set forth in the Act of Congress approved March 2, 1887.

Signed,

MATTHEW H. BUCKHAM, CASSIUS PECK, GARDNER S. FASSETT,	}	<i>Auditors.</i>
---	---	------------------



ATTEST,

E. HENRY POWELL,	<i>Custodian.</i>
------------------	-------------------